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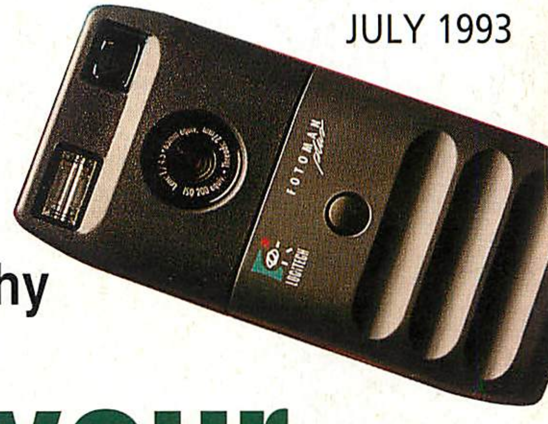
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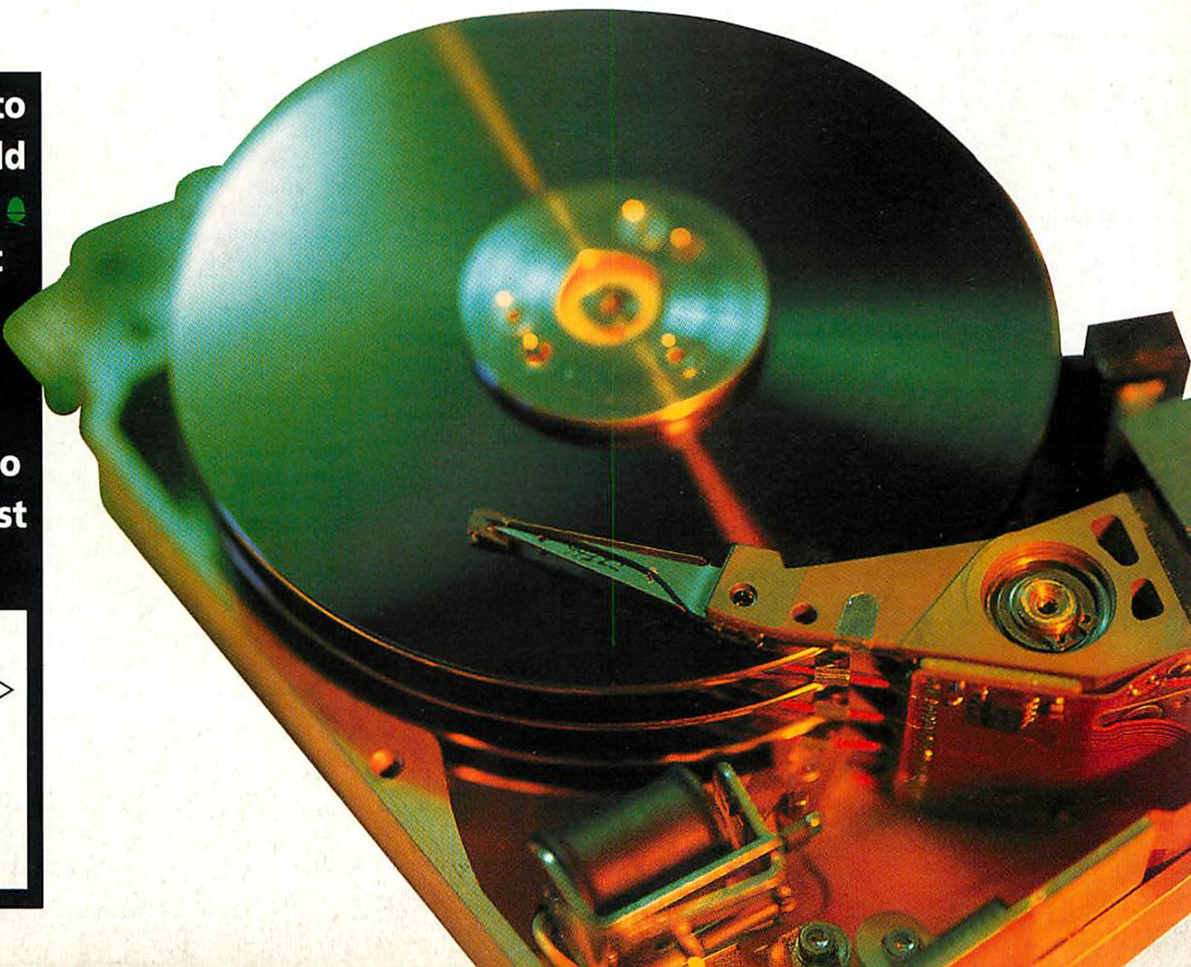
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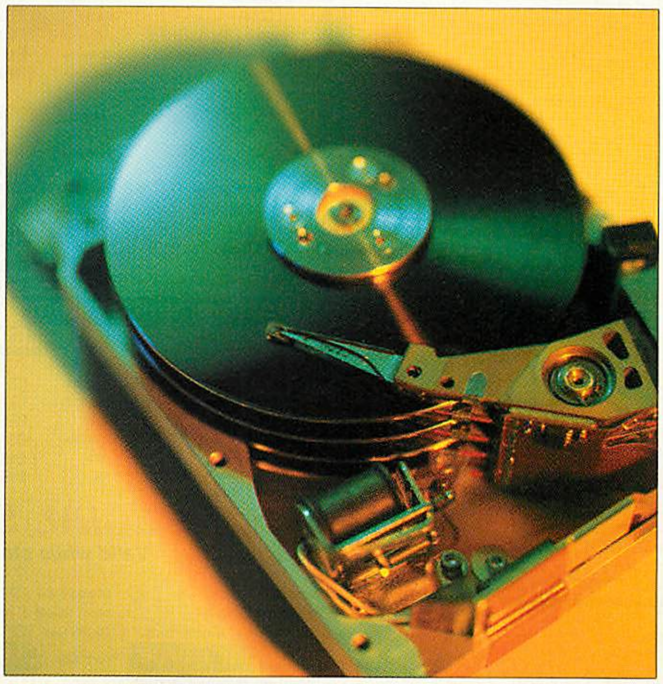
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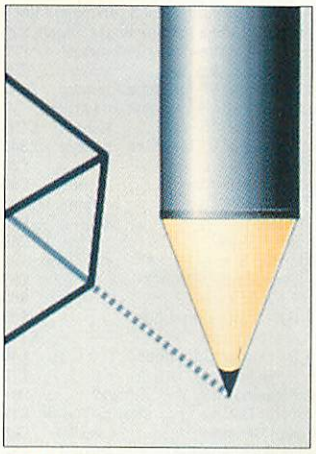
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FEATURES

HANDS ON



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Editor's letter

Our keynote feature this month looks at hard drives. Gone are the days when you had to wait quarter of an hour for your programs to load from a C90, these days people want power and plenty of it. If you are considering adding a hard drive to your system, with all its benefits of speed, flexibility and security, you have to read what Graham Bell has to say. And on the subject of improving your machine, Dave Lawrence takes a look at A3010 Ram upgrades, and finds they aren't all created equal.

But it's not all work. Dig into the games pages to find the truly head-spinning Axis. This brings arcade quality one step nearer for the Arc, as the world turns around you. Seriously addictive.

Karen Donaghay

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JUNE 1993

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ICS

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† Fitting farily easy ‡ Fitting needs expertise

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A4 Extra Battery Pack	Acorn	£50
A4 Shoulder Bag	Acorn	£35
A4000 2MB HD80	Acorn	£945
– as above + Home Office		£995
A5000 2MB HD80 Multiscan	Acorn	£1395
– as above + Learning Curve		£1455
Pocket Book	Acorn	£212

MISCELLANEOUS. . .

386 PC Expansion Card 25 MHz	Aleph One	
– 1 Mb		£374
– 4 Mb		£468
486 PC Expansion Card	Aleph One	
– 1 Mb		£463
– 4 Mb		£557
4-slot 4-layer Backplane	IFEL	£52
9060S Monitor	Eizo	£450
A300/400 Fan kit	ICS	£15
A3000 Expansion Box	Wild Vision	£135
A310 RISC OS Carrier Board ‡	IFEL	£18
A5000 Fitting Kit for second hard disc	ICS	£15
Arckey Function KeyStrip Holder	ICS	vo £3
– pack of 4		vo £10
ArcNET	ACS	£69
ARM3 ‡	Aleph One/IFEL	£165
ColourBurst	State	£322
ColourCard	CC	£225
– A3000 External	CC	£225
Dongle Dangle with screw fittings	ICS	£6
Fan filters (pack of 10) (not A5000)	ICS	£6
FaxPack	CC	£289
Floppy Discs, 10 × 3½" High Density		£10
G16	State	£258
G8 Plus	State	£238
G8 Plus Video Switch	State	£23
HiPoint Mouse for A4	Genius	£49
Micro Mouse	Clares	£26
Monitor Stand for A3000	ICS	£21
Podule Case for A3000	HCCS	£16
Print Port Sound Sampler	Leading Edge	£42
Publishing Pack	CC	£475
RISC OS 3 Upgrade	Acorn	£42
– Bulk package	Acorn	£335
– A5000	Acorn	£19
Seal 'n Type spill-proof Keyboard Covers		
– Archimedes / A5000	Kador	£14
– A3000	Kador	£14
TouchWindow	Lindis	£234
Whisper Fan Quietener (for A300/A400 series only)	ICS	£15
Wizzo IDE Filing System on rom	ICS	
– **Wizzo4** for A4		£29
– **Wizzo5** for A5000		£29

For ordering details please turn to page 3

ICS

051-625 1006

I²C PRODUCTS . . .

AnDi Oddule	Baildon	£39
I²C Adaptor (needed unless you already have an I²C socket)	Baildon	£10
I²C SWI (enhanced IIC_Control)	Baildon	£15
– bought with Oddule		£5

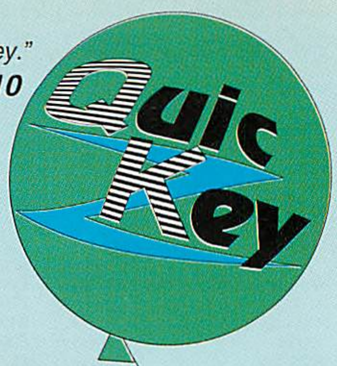
PRINTERS . . .

ArcLaser 300-6	Calligraph	£895
ArcServer 300-8	Calligraph	£985
Bubble Jet BJ-10ex	Canon	£187
Bubble Jet BJ-10ex + TurboDriver	Canon/CC	£219
Bubble Jet BJ-20	Canon	£255
Bubble Jet BJ-200	Canon	£282
Bubble Jet BJ-300	Canon	£325
Bubble Jet BJ-330	Canon	£405
Bubble Jet BJC-800 + TurboDriver	Canon/CC	£1374
DeskJet 500	Hewlett-Packard	£299
DeskJet 500C	Hewlett-Packard	£375
DeskJet 550C	Hewlett-Packard	£475
Laser Direct HiRes4	CC	£899
– 250-sheet Paper Cassette		£99
Laser Direct HiRes8	CC	£1275
Laser Direct HiRes Board	CC	£325
Refill toner cartridge for Canon EPS		£50
New toner cartridge for Canon LBP-4		£59

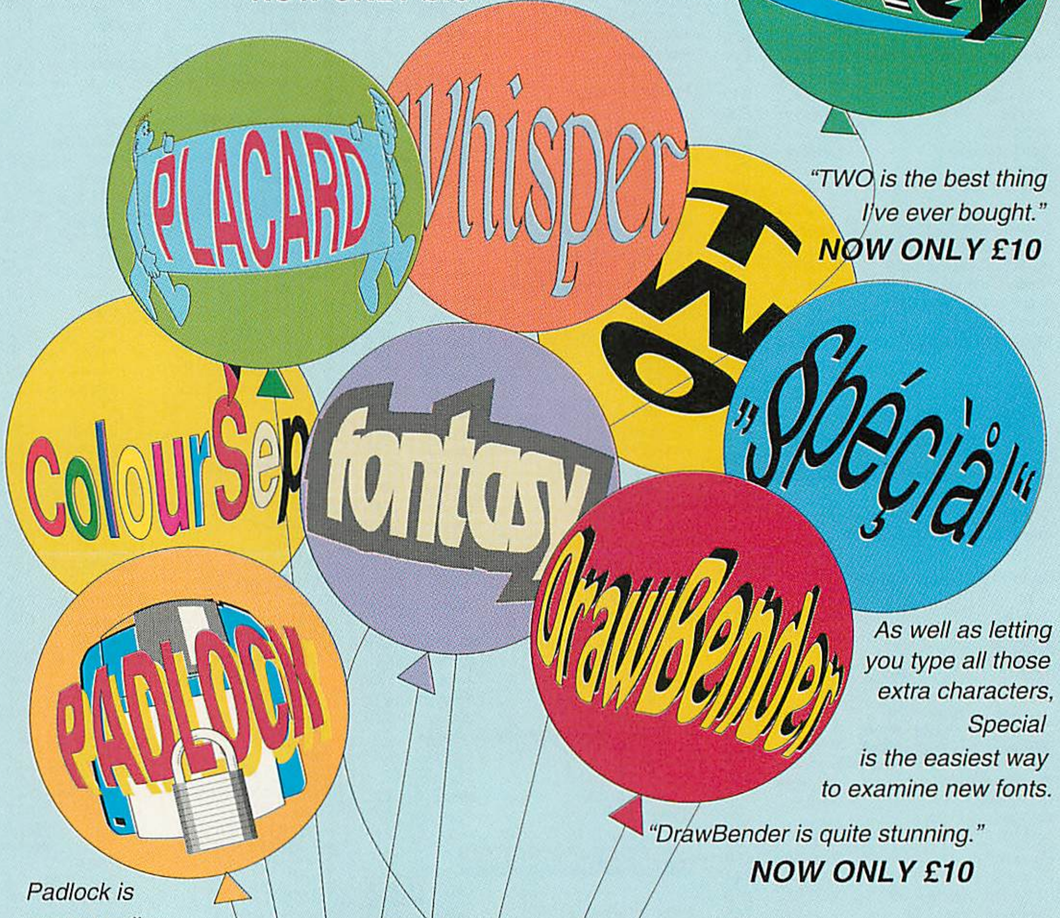
SCANNERS, DIGITISERS . . .

ArcScanner including Epson GT-4000	Clares	£1660
Colour Converter	Lindis	£145
FaxScan	Spacetech	£94
GreyHawk	Wild Visiion	£98
Handipad	TechSoft	£173
Hawk V9 MkII	Wild Vision	
– standard		£199
– hardware dithered		£259
HiVision Digitiser Colour	HCCS	
– A3000 External		£137
– A3000 Series / A4000 Internal		£124
– A5000 / 300 / 400		£124
– Upgrade from Vision		£45
iMage (Sharp JX-100)	Irlam	
– for A5000		£490
– for other computers		£589
Image Scanner	Iota	£383
– Colour Upgrade Kit	Iota	£239
– Fast Parallel Card	Iota	£98
i-Scan 200	Irlam	£539
i-Scan 400	Irlam	£589
Pineapple Colour Video Digitiser	Pineapple	£195
– A3000 boxed	Pineapple	£230
ProImage (Epson GT6000)	Irlam	
– for A5000		£989
– for other computers		£1089
Scan-Light A4	CC	£277
– with Sheet Feeder	CC	£360
Scan-Light 256	CC	£190
– A3000 internal	CC	£190
Scan-Light Professional	CC	£565
– as above + SCSI interface	CC	£699
SnapShot Colour Video Digitiser	Lingenuity	£195
– A3000 version	Lingenuity	£275
Spectra	RISC	
– Archimedes / A5000		£545
– A3000 Series / A4000 Internal		£545
– A3000 External		£555
Vision Digitiser	HCCS	
– A5000 / 300 / 400 Mono		£48
– A5000 / 300 / 400 Colour		£76
– A3000 External Mono		£60
– A3000 External Colour		£89
– A3000 Series /A4000 Internal Mono		£48
– A3000 Series / A4000 Internal Colour		£76

"You wonder how you ever managed without QuicKey."
NOW ONLY £10



"Congratulations on ColourSep! The results, compared with the drivers currently available, are bordering on the fantastic."
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"TWO is the best thing I've ever bought."
NOW ONLY £10

As well as letting you type all those extra characters, Special is the easiest way to examine new fonts.

"DrawBender is quite stunning."
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Padlock is our top seller for simple disc security.

"Fontasy offers a wider range of effects than FontFX. It is a package for the perfectionist, whether professional or enthusiast."
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HOW TO ORDER

VAT: Zero-rated items are marked V0. UK customers please add 17.5% to all other prices. EC customers outside the UK (including BFPO) please do the same unless you are VAT registered, in which case quote your international VAT number. Ours is GB 595 7258 84.

CARRIAGE IS FREE WITHIN MAINLAND UK IF YOU PAY ON ORDERING.

Overseas carriage: If you are paying by credit card we will add airmail and insurance at cost. Otherwise please add £6 (Europe) or at least £12 (elsewhere) for each software item and send a pounds sterling bank draft payable at a London clearing bank, or Eurocheques for not more than £100 each.

Credit cards are welcome. We do not charge your account until your order is fulfilled. Your name and address must be as known to the credit card company. If you are leaving an order on our answering machine please include your telephone number, the expiry date of your card, and your calculation of the total payment due. We will make no charge for credit card commission unless we have informed you first.

Official orders are welcome from UK government and educational institutions. Payment is due in 14 days. Invoices are subject to carriage and late payment charges.

Site licences are available for most products. Please check our prices.

All products, prices and specifications are offered in good faith and are subject to change without notice. We process all orders immediately, but suppliers do sometimes keep us waiting. Goods are guaranteed but we do not supply them on approval. Returns and cancellations can only be accepted by prior agreement and there may be a charge to cover the costs involved.

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ICS (Ian Copestake Limited)

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Tel: 051-625 1006 Fax: 051-625 1007

E&OE D61 93MY20

LICENSED CREDIT BROKER



ACORN GOES BACK TO SCHOOL

ACORN is to intensify its attack on the education market with a package bundled around the A3020.

Discovery is an integrated curriculum pack, pitched directly against the Window Box system from Research Machines. At £1149, though, the Acorn bundle will significantly undercut its competitor.

In addition to the hardware, the Discovery package includes *Advance*, the integrated spreadsheet, database, wordprocessor and graphing package; the adventure game *Crystal Rainforest*; and Longman Logotron's multimedia authoring system *Magpie*.

Discovery also contains materials specifically tailored to the National Curriculum. It should be with dealers by the time you read this. For more details call Acorn on (0223) 254254.



The Discovery Pack from Acorn, aimed squarely at the education market

RISC OS 3 PRM DEBUT

ACORN has finally started to ship the finished editions of the Risc OS 3 *Programmer's Reference Manual*.

For £99 you get four volumes totalling 3000 pages, almost double the size of the original Risc OS 2 PRMs. The new manuals have plenty of programming examples plus detailed sections on making the best use of Risc OS 3.

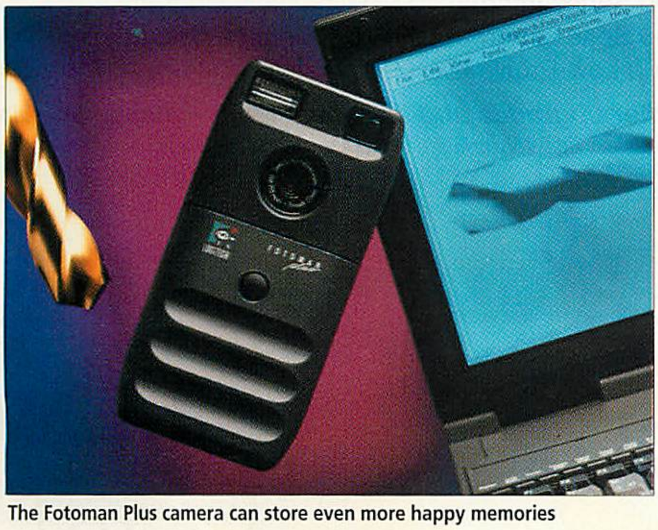
A new Risc OS Style Guide is also included in the price, but this won't be available until the autumn, when it will be sent free of charge to those who have bought the new PRMs. Upgrades from the Risc OS 2 PRMs cost £59 plus £4 p&p by sending the front cover of the index to the original volumes. Contact Vector Services at 13 Dennington Road, Wellingborough, Northants.

FOTOMAN DEVELOPS

LOGITECH has improved its monochrome FotoMan digital camera.

The new FotoMan Plus, at £599 + VAT, boasts a resolution improved by 70 per cent to 150,000 pixels, faster picture transfer from camera to computer, a better flash system and a longer lasting rechargeable battery.

Although picture data size has increased with the boosted resolution, JPEG image compression means the same number of images, 32 in all, can be stored in the camera at one time. Though aimed primarily at the PC-compatible market, the original FotoMan camera formed part of niche market imaging systems for Archimedes customers developed by companies like DT Software. Logitech can be contacted on (0344) 891452.



The Fotoman Plus camera can store even more happy memories

CC PRINTER BONANZA

COMPUTER Concepts has produced versions of its fast alternative Risc OS printer drivers, called *TurboDrivers*, for use with the Hewlett Packard family of DeskJet printers. They will be available by the end of June at £49 + VAT. A HP *TurboDriver* for Hewlett Packard's Laserjet laser printer standard is currently under development too.

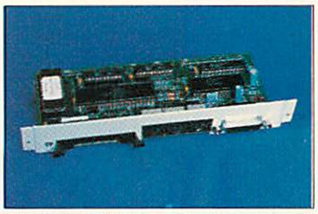
● Canon has announced another innovative bubble-jet printer, the BJ230, an A3 version of the BJ200. CC is introducing the BJ230 at £319 + £10 carriage + VAT including the relevant *TurboDriver*. The number is (0442) 63933.

Canon has also reduced the price of the BJ200 so CC is now supplying the BJ200 with *TurboDrivers* for £275 + £10 carriage + VAT.

● Network versions of *ArtWorks* and *Impression* are now available for use on Econet and AUN networks. This removes the need to have dongles to run the software.

MIDI FROM MORLEY

MORLEY Electronics has announced a combined Midi interface, user port and analogue interface card for A3000 and A4000 series Acorn machines. A full-size card version of the product has been produced for A300/400/540/5000 machines, but without the Midi interface.



Morley's Midi/User/Analogue card

Analogue and user ports are used for dedicated control and data-logging applications as well as for connecting concept keyboards. Most Midi-compatible instruments can be controlled by an Archimedes fitted with Morley's new card.

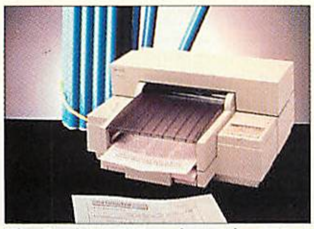
Both versions are priced at £59 + VAT. Morley can be contacted on 091-257 6355.

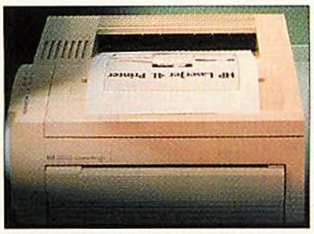
MAJOR REVISIONS TO HP RANGE

IT'S all-change at Hewlett Packard this month with the introduction of several new printers plus welcome price cuts on some existing models.

At a recommended price of £329, HP is replacing its ageing HP DeskJet 500 and DeskWriter inkjet printers with the new HP DeskJet 510. Improvements include a new paper-handling mechanism, faster printing and a larger capacity paper tray. Printing resolution remains at 300dpi.

At the other end of the scale, the new colour HP DeskJet 1200C and 1200C/PS printers are priced at £1389 and £1939 respectively – the latter model features a PostScript interpreter as well as HP LaserJet 4 compatibility. HP claims the 1200 series colour inkjet printers outperform most rival thermal wax-transfer printers and are cheaper to run.

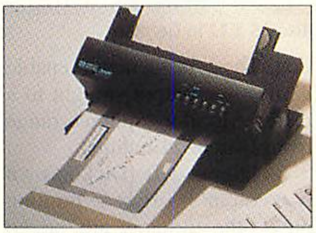

The DeskJet 510 replaces the 500


The LaserJet 4L: crams more in

At the same time, HP has announced its cheapest laser printer yet, the HP LaserJet 4L, with a RRP of £649 + VAT. The printer's data compression technology, which HP calls Memory Enhancement, enables full-page graphics to be rendered from just 1Mb of printer memory instead of the more usual and more costly 1.5Mb. The 4L also boasts an economy mode to reduce the amount of toner used per page and a power system which reduces overall consumption.

Finally, HP has reduced the price of its recently-introduced DeskJet Portable to just £249 + VAT. Complete with the optional automatic sheetfeeder the total price is now £290 + VAT, less than the original price of the printer on its own.

For more information, HP can be contacted on (0344) 369222.


HP's new DeskJet Portable

ACORN IN AUSTRALIA

THE 1993 Acorn International Conference is to be held in Australia at Penrith, New South Wales on 26 and 27 June. It is expected that a large number of overseas software and hardware developers, including several from the UK, will be there.

Keynote addresses will be made by the former head of South Australia's School of the Future and Sam Wauchope, the managing director of Acorn. Also in June is the Sydney Home Computer Show.

Acorn Australia will be represented there as well as the Australian Computers in Education Conference.

Acorn's national marketing manager in Australia, Peter Revell, can be contacted for any further information on (+61) 3419 3033 or fax (+61) 3419 2892.

GENUP LITE FROM APA

APA multimedia has released a *Genesis* multimedia compiler called *Genup Lite*. The package enables any *Genesis Plus* or *Genesis II* application to be speeded up by compilation.

Efficient file management means applications can be used effectively across most networks. Compiled applications do not need to have the compiler present to run. A fast indexing utility is supplied with example applications and a utility for marking resource files for later access. *Genup Lite* is priced £79 + VAT, though education customers get a £30 discount.

● APA has produced a junior version of its successful *Woodland* projects and audio/graphic resources CD-Rom. This can be installed on a hard disc or file server with a minimum of 6Mb free space.

Junior Woodland is aimed at pupils in Key Stages 2 and 3 and is concept keyboard-compatible. *Junior Woodland* on CD-Rom is priced £49 for education customers. APA Multimedia is on (0634) 295222.

POCKET-SIZED FAX ON THE MOVE

TWO interesting pocket-sized solutions have come to light for those who want to use their Archimedes, PocketBook (or Beeb for that matter) to send fax messages.

The first is US Robotics' latest WorldPort pocket fax modem, the PalmTop. This doesn't need any special fax software to be running on the host computer. Instead it accepts ordinary Ascii text files and converts them into fax pages as they are transmitted down the phone line, so effectively allowing straight Ascii files to be sent in the correct format straight to a remote fax machine.

This means the PalmTop modem can be used with any computer with a standard serial communications port, which includes Acorn's PocketBook



USR's WorldPort fax/modem



A Roadrunner Rocket that fits in your pocket

(or the similar Psion Series 3 organiser) when fitted with an A-Link adapter.

Eight-bit Beeb users frustrated by the lack of fax software for the latest generation of fax modems can use the PalmTop to send faxes as well. There is no fax receive facility, though a 2400bps data modem function, without error correction, is built in. The WorldPort PalmTop costs £399 + VAT.

Meanwhile, Andest Communication has introduced its strikingly-styled Roadrunner Rocket, the first 14,400bps (V32bis) pocket fax and data modem with the all-important BABT approval for less than £400. The Rocket, which costs £399 + VAT, is Class 2 fax-compatible and should work with David Pilling's *ArcFax* package, which allows fax modems to work with the Arc.

Andest can be contacted on (0908) 263300, USR on (0753) 811180, and David Pilling at PO Box 22, Thornton Cleveleys, Blackpool FY5 1LR.

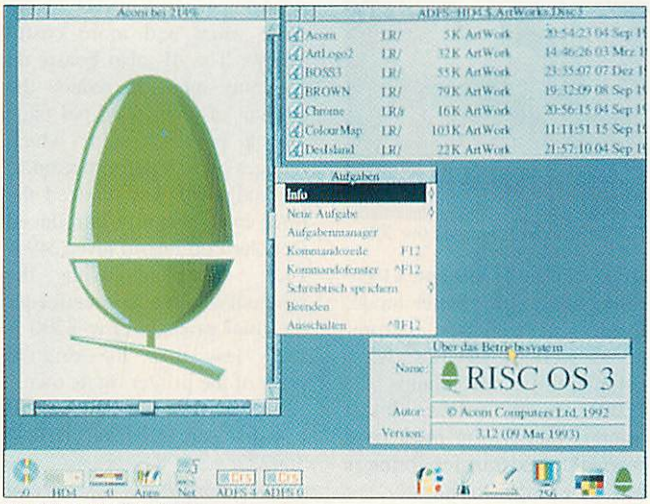
ACORN SIGNS PRE-PRESS DEAL

ACORN has signed an agreement to supply A5000-based systems as part of a range of pre-press printing outfits.

The outfits originate from the Germany subsidiary of US printing specialist AB Dick. The deal follows Acorn's unveiling of a German-language version of Risc OS at the Hannover CeBIT show in March (see News in June's *Acorn User*) and the securing of a similar deal with AB Dick in Holland last year.

Customers will be offered an A5000, a 256-greyscale flatbed scanner, Computer Concepts' *Impression II* DTP software, 200 outline fonts and PostScript printer drivers to give them compatibility with industry-standard photo-typesetting equipment.

There will be a choice of an A4 600dpi direct drive laser printer, or an oversize A3 version from Calligraph, which offers up to 1200dpi resolution. These printers will enable work to be output straight to a plate. Monitor options range from 14in to 21in units.



Risc OS 3.12 in German

Including AB Dick's own two-colour offset printing press, the systems are priced from DM18200 (£7400) to DM 34,500 (£14,000). At this level, the systems are undercutting many comparable traditional pre-press solutions.

To enhance the systems further, an easy to use job-entry menu system is under development to enable anyone to use the system with the minimum of special training.

KEEP VIGIL ON BUGS

RHEINGOLD Enterprises, of Warrington, has announced *Vigil*, a multi-tasking monitor/debugging application for programmers who create desktop applications on Risc OS 3.

Vigil can be used to display the contents of processor registers, application workspace, blocks of memory, Basic variable values or Wimp messages for applications.

There is also a memory compare function, a simple timer for developing time-critical applications, and an Arm code disassembler.

An innovative feature is that Basic variables can be displayed dynamically while the program they relate to is executing. *Vigil* is scheduled for release in August priced £24.95.

For further information contact Rheingold on (0925) 210657.

MULTIPLE ACORN

ACORN has revealed its involvement in MultiWorks, the Esprit (European Strategic Programme for Research and Development in Information Technology) project which started in January 1989.

The project, which has its emphasis on multimedia applications and solutions, has provided funding for a number of component projects. These include the development of the Arm3 Risc processor (then produced by Acorn rather than Arm Ltd) and the Acorn Replay software-based full motion video system.

Three levels of MultiWorks workstations have so far emerged from the project, including a high-end Unix-based system and a mid-range Unix or Windows multimedia delivery system.

The low-end low-cost MultiWorks workstation is based on an Acorn A5000 running *Replay*. The Acorn-based MultiWorks system is downwards compatible with high-end authoring systems developed by MultiWorks.

CUMANA ROUND-UP



The multi-session Photo CD-compatible 600 series CD-Rom drive

CUMANA has launched a new high-speed CD-Rom drive. The 600 series is multi-session Photo CD-compatible and offers a data transfer mode in excess of 300K per second plus an access time of 295ms.

A 256K buffer ensures that fast graphics, as used by full-motion video from *Replay*, run unhindered. Data lines are protected from radio interference, and the laser lens is automatically cleaned whenever a new CD-Rom caddy is loaded.

Slimline external versions of the drives start at £429 + VAT for education, and standard models start at £565 + VAT.

Cumana has also introduced its Expandable Multi Use interface (EMU) which allows up to seven different interfaces to be connected to A3000 and A4000 series computers. A User Port is standard on the EMU baseboard and expansion options include an IDE controller, Midi, analogue port, SCSI and Cumana's Companion interfaces. Cumana expects to add to the list later in the year. The EMU base board with User Port is priced £49 + VAT for education. Additional interfaces start at £38 + VAT.

Cumana can be contacted on (0483) 503121.

PORTABLE ASSISTANTS

ANOTHER source of commercial software for the Acorn PocketBook/Series 3 user has come to light.

Portable Software is based in York and has just launched its *Assistant* suite of business tools for the Psion Series 3; these should also run on the Acorn PocketBook.

Five *Assistant* modules are available. *Timing Assistant* is a stopwatch for people who charge time-based fees and is linked to a bill-generating utility. *Banking Assistant* is a multi-account cashflow monitor. *Text Assistant* is an aid to generating standard letters, *Sales Assistant* is for sales people on the move, converting orders into delivery notes, updating stock records, invoicing, and so on.

Data Assistant, which is supplied with all the other modules except *Banking Assistant*, enhances the operation of the Series 3's built-in database application. *Assistants* cost £89.95. For more information phone or fax Portable Software on (0904) 633918.

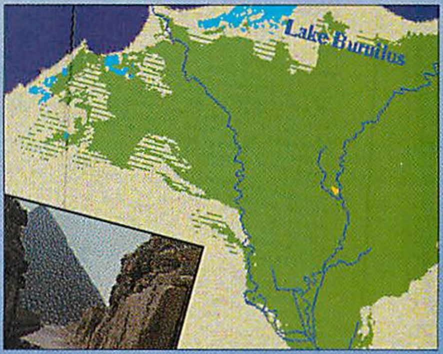
REVELATION ImagePro



❛ Revelation ImagePro contains just about every feature that you could imagine to aid in the preparation of pictures and enhancement of existing images.❜

❛ At an amateur or professional level, ImagePro suits the needs of both.❜

Peter Clements, Archimedes World



❛ If you want this kind of package, then ImagePro is the one to buy... It's a superbly professional application.❜

Richard Hallas, RISC User

STATE OF THE ART PAINT AND IMAGE PROCESSING





Create sprites in 2, 4, 16 or 256 colour modes (including new standard palette high-resolution modes now supported by third-party graphics cards).

✦

Tools include user defined brushes, sprays, bristle and other painting effects.

✦

Over 100,000 dithered colours under RISC OS 3.

✦

Fully editable graduated blends giving antialiased effects, directional graduations and image superimposition.

✦

Variable sensitivity tracing, blurring, sharpening, dithering and mosaic effects.

✦

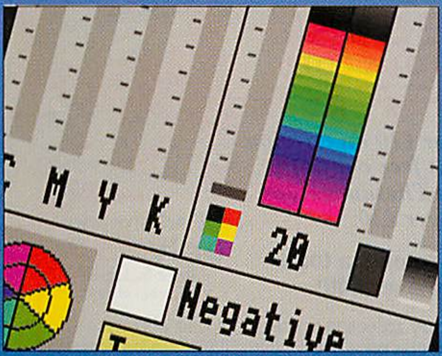
Control over hue, saturation and contrast on whole images, selected colours or selected areas.

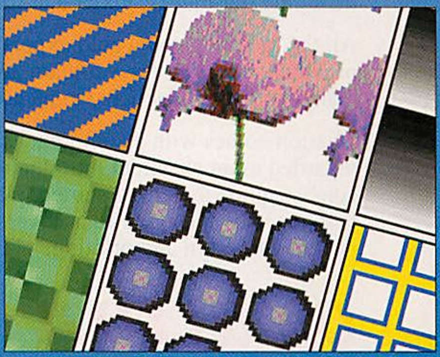
✦

Internal colour processing at 24 bits per pixel (dithered onto standard 8 bit sprite).

✦

Tint, RGB and CMYK colour models.





LONGMAN LOGOTRON

Revelation ImagePro — £139 Single User pack
£400 Educational Site Licence
£600 Business Site Licence (per 16 users).

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Tel: (0223) 425558 Fax: (0223) 425349



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If its time you smartened up your documents, Ovation with its superb range of facilities and competitive price is the ideal choice. In no time at all, we guarantee you will be producing professional-looking documents using a wide range of typefaces in different sizes and styles and with pictures added too. It is already used on thousands of sites across the country for producing a wide range of documents ranging from simple letters to complete books. Ovation produces excellent results on a range of printers including dot-matrix, inkjet and for professional results, laser.

All the facilities you would expect in much higher priced software are provided, but in an easy-to-learn and easy-to-use package. There are too many features to list here, so please write or phone for a full specification.

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ovation

Please phone for education and site licence prices.

A working demonstration version of Ovation is available for £5 inclusive (refundable on purchase of full package).

FREE Thesaurus

Buy Ovation now for a FREE copy of Desktop Thesaurus, the best selling word-finder for Acorn machines. It contains over 17,000 keywords and 180,000 carefully chosen alternative words. Desktop Thesaurus integrates fully with Ovation, providing a very powerful word processing tool.



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Save over £20 on Ovation and get a free copy of Desktop Thesaurus worth over £20.

This represents a total saving of over £40!

Total inclusive price only £99

Price includes VAT and carriage.

This offer only applies to single-user copies of Ovation bought at full retail price directly from RISC Developments. Offer ends July 31st 1993.

RISC developments

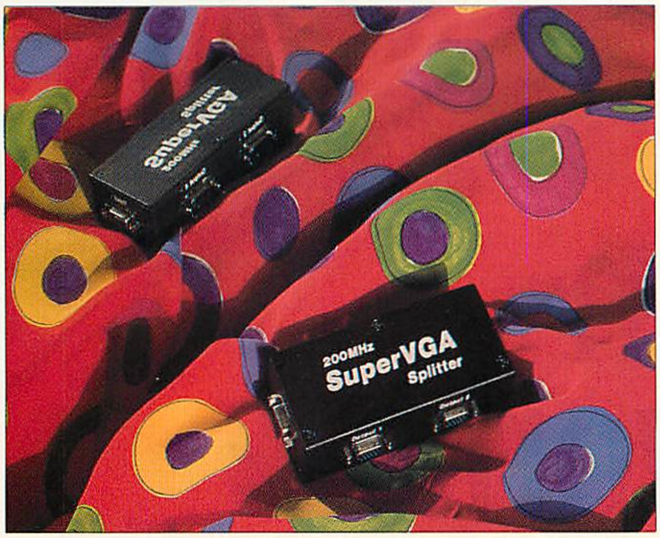
RISC Developments Ltd 117 Hatfield Road, St. Albans, Herts AL1 4JS Telephone 0727 840303 Fax 0727 860263

MINI EXTERNAL VIDEO SPLITTER

IF you need to feed several monitors from a single Archimedes, Scene Double might have the solution.

Its new, miniature external SD2+2X video splitter can replicate, distortion-free, a computer display to a total of four monitors up to a resolution of 1600 x 1200 pixels, non-interlaced. The unit was designed for PCs and the Mac, but has been tested successfully on the Acorn A5000 and A4.

Using low-loss cabling, remote monitors can be situated up to 100m from the computer. SD2+2X splitters cost £299 + VAT. For more information contact Scene Double on 081-958 3639.



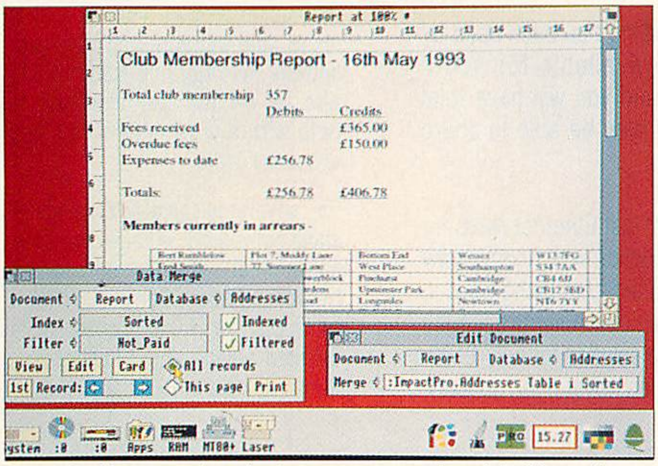
Splitting images with the SD2+2X

PROFESSIONAL IMPACT

CIRCLE Software has come up with a professional version of its successful *Impact!* database system, called *Impact-Pro!*

Enhancements include improved reporting, stored field selections for labels and reports, live calculations on record cards and reports, flexible field mapping during import and export, direct multi-column label printing, sprite graphic fields and multi-line text fields.

Impact-Pro! is priced £65 + VAT and *Impact!* users can upgrade for £15 + VAT. The price of *Impact!* has been cut to £39.95 + VAT. Circle Software is on (0793) 770021.



Impact-Pro! has a number of enhancements over the original Impact!

NEW CARDS ARE DEALT

THE latest addition to Risc Developments' networking product range is a 10BaseT adapter. This uses American, telephone-style connectors and unshielded twisted pair (UTP) cabling instead of more expensive co-axial. The 10BaseT card is priced £139 + VAT.

A full-size podule version of Risc Developments' combined User Port, Analogue Port and Econet interface, first released for the A3000/4000 earlier this year, has been produced for the A5000 and other Archimedes with full size expansion slots.

The card is available without the Econet section for £44.95 + VAT and with Econet for £79.95+VAT. Risc Developments are on (0727) 840303.

ARM GOES TO TEXAS

ANOTHER prestigious name has joined the ranks of those licensed to use Arm chips.

Arm technology will find its way into the electronic management systems of tomorrow's cars, thanks to new technology being developed by Arm Ltd and huge semiconductor manufacturer, Texas Instruments (TI). Derivatives of the Arm CPU core will be embedded into system controller chips which will manage ignition and fuel systems, four-wheel steering, traction control and anti-lock brakes.

TI expects to sell these automotive control chips to big name manufacturers like Ford, GM and Toyota. Prospective sales are in the multi-millions as demand for electronically-managed engines rises in line with anti-pollution legislation.

Robin Saxby, managing director of Arm Ltd, told *Acorn User* the deal was good news as TI needs to mate Arm technology with its own, world-beating DSP (digital signal processing) chips.

Arm Ltd has revealed that the Arm700 chip family (an improved Arm600 with lower power consumption, smaller size and larger cache) is scheduled for the fourth quarter of 1993. Speculation suggests Acorn's next generation of machines will use the Arm700.

News in brief

● BEFORE the end of this year Acorn should be operating from a new headquarters at Vision Park near Histon, just north of Cambridge. This means Acorn will leave its current two main offices at Newmarket Road and the converted waterworks in Fulbourn Road, Cherry Hinton.

Acorn's small training department will remain where it is at Newmarket Road. The new, purpose-built high-tech building at Vision Park will accommodate around 200 staff in total and will become Acorn's new registered office. Acorn's phone number, which was changed to (0223) 254254 last year, will remain unchanged after the move.

● The Electronic Font Foundry (EFF) has moved premises. The leading provider of Risc OS fonts can now be contacted at Gibbs House, Kennel Ride, Ascot, Berks, SL5 7AQ, tel: (0344) 28698.

EFF has also announced it is to publish a range of Acorn-specific handbooks on publishing software as well as a new Risc OS 3 font design package.

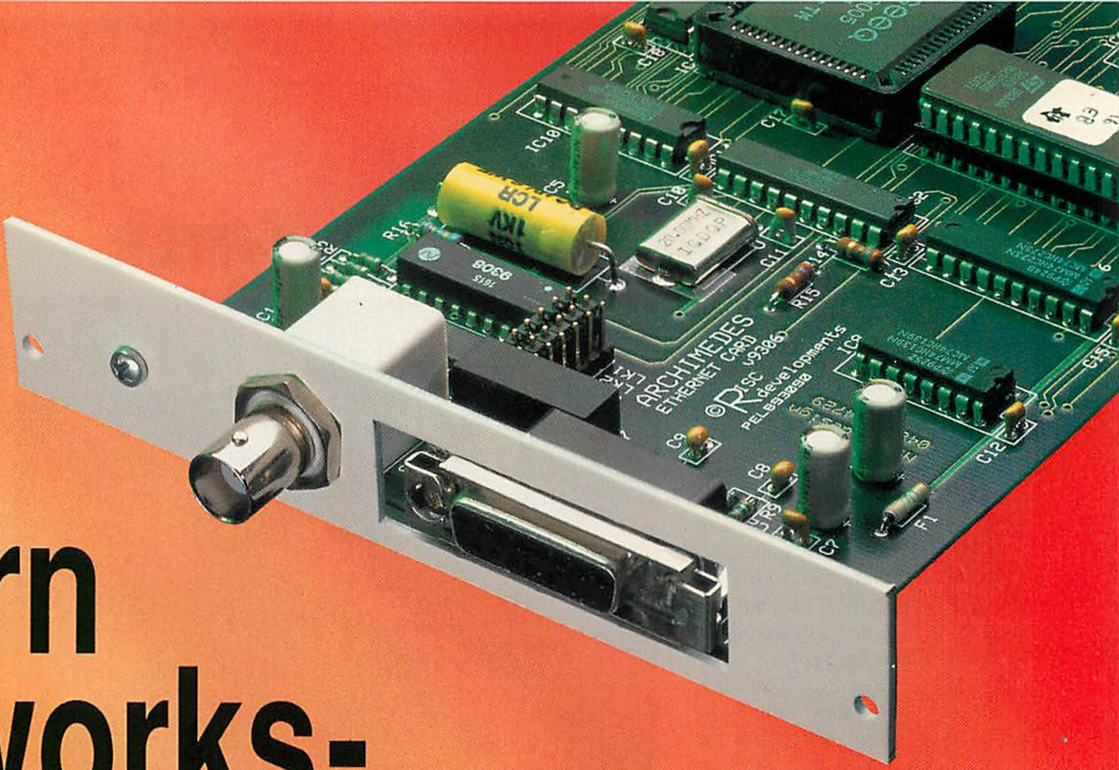
● Beebug and Risc Developments will be opening up shop on Sunday 27 June. Visitors can try out an Archimedes network and take advantage of special open day discounts like £150 off an A5000 Learning Curve, £75 off an A3010 Learning Curve, or £160 off an A5000 HD120.

A new *Easy C* programming language is due to be unveiled and the new *Sleuth* OCR package, previewed two months ago, gets its official launch. Beebug and Risc Developments are on (0727) 840303.

● Robert Treen, executive producer of video production firm RTPS Systems, is looking for your help in planning an affordable video guide to Midi.

There are several Midi interfaces and compatible software packages for Acorn computers. Robert is keen to hear from users so he can find out what they think should be in the video, to be called *The Video Guide to Midi for Humans*.

If you feel you have some useful comments, write to Robert Treen at RTPS Systems Ltd, Somerville, Rectory Lane, Fringford, Bicester, OX6 9DX.



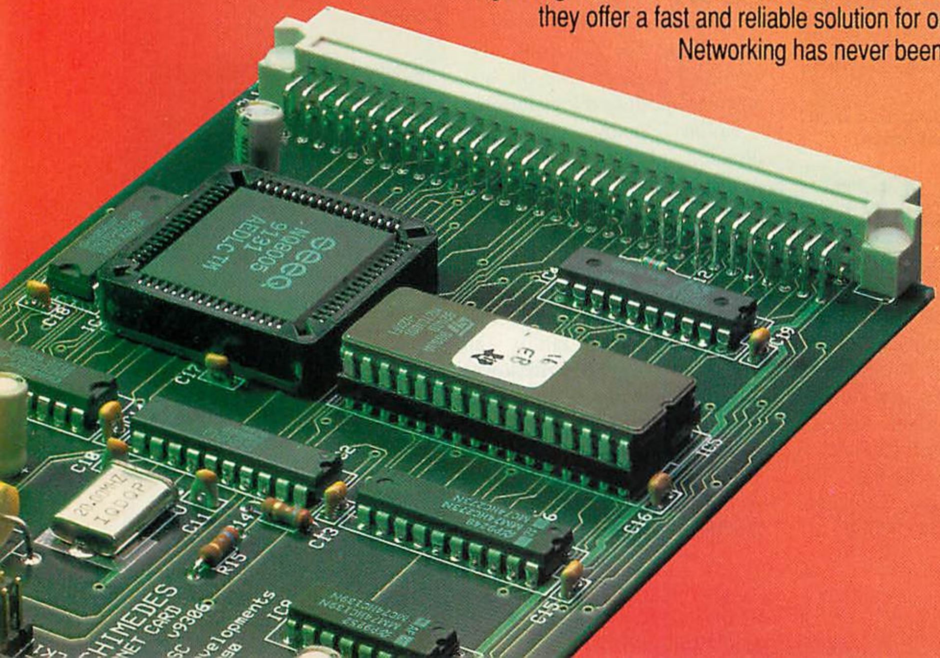
Fast Acorn Networks-

- WITH ETHERNET

Managing a class of children all trying to run the same program on floppy drive computers can be a nightmare. Discs get lost or damaged and files can be corrupted, all of which will waste a lot of time at the beginning of a lesson. With hard drive machines things are a little better, but the duplication of resources means wasted money. And there is still the problem of students having different versions of the software or 'accidentally' overwriting it. Not to mention viruses!

Now there is a reliable alternative - Ethernet. Ethernet networking has been used by businesses and universities for some time, and is now available for Acorn computers. The benefits of a fast network are considerable, and you will have total control over the software used by the students. All users will also be able to share resources like CD players and printers, significantly reducing costs.

RISC Developments have designed and produced a full range of fast Ethernet cards for all Acorn RISC computers, to be used in conjunction with Acorn's new AUN Level IV network software. Our cards are being used in a growing number of educational establishments because they offer a fast and reliable solution for only £139. Networking has never been so easy.



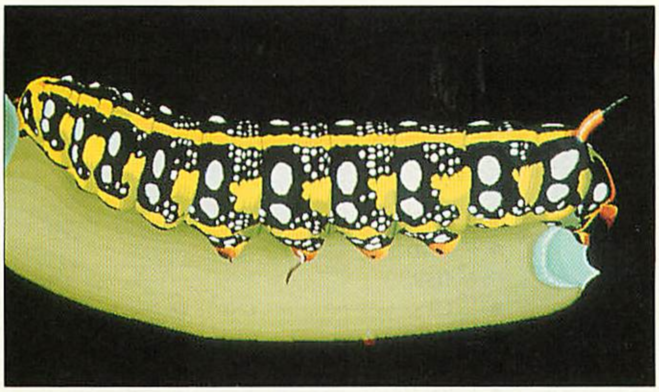
We also offer a complete range of services for the network user. In the first instance we would be pleased to discuss the planning of your network, and ways to maximise speed and make best use of available resources. We can offer a full cabling service, configure your systems, install your software and train your network manager and staff. We will also still be available afterwards to help with any problems that you encounter later.

For anyone wishing to know more about networking, we have produced a pamphlet called 'Introduction to Networking Acorn Computers'. For a free copy, or if you require more detailed advice about networking, please do write or telephone.

RISC developments

RISC Developments
117 Hatfield Road, St. Albans,
Herts, AL1 4JS.
Tel: 0727 840303 Fax: 0727 860263

CLARES UNVEILS PROARTISAN 2



ProArtisan 2: could be moving into the number one slot

PROARTISAN 2, used in last month's graphics round-up, came a close second to *Revelation ImagePro* by Longman Logotron. But having seen the most recent version of the package, Longman Logotron may have to start thinking about an upgrade to keep their number one slot.

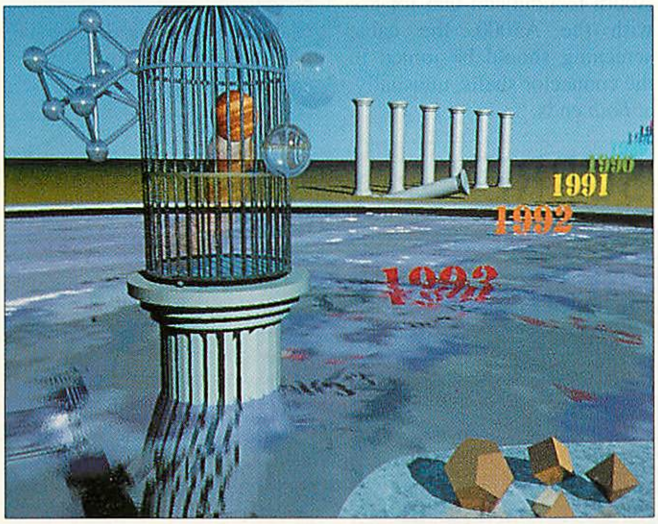
ProArtisan 2 is very different to the first version with many new features. For instance, in Paint mode you can paint different types of surface onto your picture such as stone or basketweave. Flood fills give the ability to squash sprites into a chosen area. In *Draw* mode the joining of two lines can be mitred, rounded or bevelled. Sprite handling has been enhanced and it's now possible to do all manner of tricks with them, including distorting them into predefined areas, and mapping them onto spheres. Sprites can also be made semi-transparent and overlaid in a number of ways.

But perhaps the best addition is a number of image processing tools that can, for instance, adjust the luminescence of a picture or the balance of colour. Special effects can be applied and the ability to design your own is included. One particularly clever effect is Emboss; this makes a picture look as if has been carved onto a stone slab.

The palette has also been improved and it is now possible to use colours as washes. The intensity of any colour can be varied by using a simple slider bar.

The release date for *ProArtisan 2* has been set for June. For more details contact Clares on (0606) 48511.

PICTURE OF THE MONTH



THIS month's prize winning picture comes all the way from Holland and is the work of Hans Marks.

Cage was created entirely using YART (Yet Another Raytracer), which is Hans' own home-grown raytracing software, and makes excellent use of the high resolution possible in Mode 21. For the technically-minded among you, Hans' program uses advanced texture mapping to achieve the rippled water effect as well as the surface of the planet in the cage. A full programming language is used to describe the various images, and macros can be used to simplify complex scenes.

Floyd Steinberg error diffusion is employed to give the impression of more colours than are normally present in the Arc's palette, similar to how *ChangeFSI* scans and digitises images.

GRAPHICS TO A TEE

THE graphical abilities of the Arc make it one of the favourite machines when high resolution, colour pictures are called for.

Everything from processing satellite information to producing pop videos has been done on an Archimedes at some time or other, and the list is growing every day.

Jean Van Mourik has been using his A3000 computer to produce fractal graphics for use on postcards, teeshirts and posters. What started as a hobby has grown into quite a cottage industry, with demand for his fractal designs forever on the increase.

Anyone who is interested in finding out more about the world of fractal graphics should contact Jean at Third Millennium Computer Graphics, 4 Pantllyn, Llandybie, Ammanford, Dyffed, SA18 3JT. Or, if you use your Acorn computer for an unusual graphics project, write to us at the usual address.

News in brief

- Owners of Computer Concepts' ColourCard graphics accelerator podule can now design their own modes, including non-desktop, 15-bit colour modes.

Computer Concepts has produced a screen designer application, specially designed for use with the ColourCard, that will generate self-contained, relocatable modules. New versions of Acorn's Replay software will support playback in 15-bit colour modes and the screen designer can generate modes specifically for this purpose. For further information call Computer Concepts on (0442) 63933.

- Also new from Computer Concepts this month is the release of a range of updated *Turbo Drivers* which replace the standard printer drivers and offer speed increases of up to three times. All *Turbo Drivers* are now designed to be fully Risc OS 2 and Risc OS 3-compatible and will support rotated sprites and text.

They will also work with the Risc OS 3 Printer Manager allowing more than one printer driver to be installed at once. Printers supported include the Hewlett Packard DeskJet, DeskJet Plus and DeskJet 500, plus colour printers including the DeskJet 500C and DeskJet 550C. The range of Canon bubble-jet printers, including the newly launched BJ-230 A3 model, can be driven via their own *Turbo Drivers*.

- Pete Worrall, who regularly writes for *Acorn User*, will be exhibiting his own work at Harborne Library, Harborne High Street, Birmingham. Called Electric 6 3/4, the art exhibition runs until the end of June and features large prints of Acorn-based work.

- Contact the Graphics Page by writing to Rob Miller, The Graphics Page, Acorn User, 101 Bayham Street, London NW1 0AG, or by modem via Arcade BBS user #1144. Arcade is on 081-654 2212 or 081-655 4412.

If using Arcade please keep it to just messages. Any large files such as pictures should be sent on disc to the BBC Acorn User address given above.



GETTING YOURSELF CONNECTED

ARCHIMEDES users who buy modems are often unsure how to wire the serial cable that connects the computer and modem, and allows them to talk to each other.

Often, a standard PC-AT 9-way to 25-way D-connector cable may be supplied. If not it is readily and cheaply available from PC computer stores.

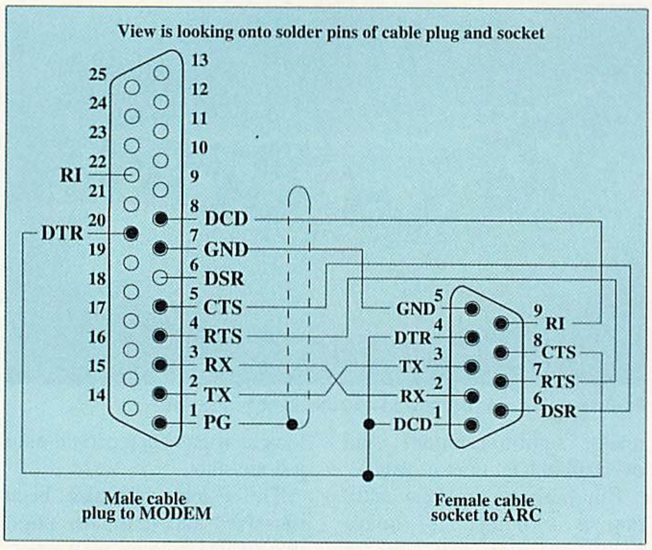
The problem is that these PC cables may work with certain machines and certain software, but very often some, or all, functions will not work at all.

There are two basic reasons for this. The first is that on the original A300 and A400 series machines, some versions of the serial interface chip were bugged, so 'normal PC' wiring could not be used. Knowing this, the authors of pioneering Archimedes comms software were able to use other parts of the chip circuitry in a way that overcame the problem, but required the wiring between modem and computer to be non-standard.

Subsequently, and secondly, later machines were fitted with different chips that could work with PC wiring. However, most Archimedes comms programs still expect modified wiring, and will not work with standard PC wiring.

Exceptions to this are Risc Developments' *Hearsay 2* and David Pilling's *ArcFax*, which work happily with a PC cable on the latest machines. Even then, they do not always work and not with some A5000s and the A4 portable.

There is a simple answer for all Acorn 32-bit hardware. Use a cable wired as in the diagram: the original non-standard wiring. Most Archimedes specialist modem and comms suppliers will provide a cable wired this way with their products, but if you are having problems, check the cable connections and ensure they match what is shown here. Note that Acorn recommend that for use with the A5000, the cable screening should be joined to the connector shells, unusually, at *both* ends.



Connecting your Acorn and modem. Easy when you know how

PSYCHO ON THE LOOSE IN SURREY

PSYCHO BBS is run by Nick Hutton from Godalming. Nick's ARCbbs system runs on an expanded 4Mb A310, fitted with an Arm3 and a 664Mb NEC SCSI hard disc.

Files include hundreds of Arc utilities, games, demos, films and pictures. Psycho also has a selection of 24 bits-per-pixel picture files, at screen resolutions up to 1152 x 900.

Psycho is the only BBS in the UK to feature Ansi animations online, by the American ACiD (ANSI Creators in Demand) group of artists. To view these properly, you need a full Ansi palette, which makes the desktop rather lurid.

Other features include a Bargain Hardware section, and a Latest Products area, where you'll find text descriptions and reviews of the latest Acorn machines, Arm Ltd chip sets, and other Acorn-related products – like the Apple Newton and the 3DO games console. The Information section gives advice on common problems.

Psycho BBS is online 24 hours on (0483) 418467 at 300-14400bps, V42bis, MNP5, V32bis and HST standards.



The Psycho BBS filebase selection

News in brief

● Lee Archer's Northern Arc BBS is back after a six month break and is online from 10pm to 8am. It is located in Mexborough, South Yorkshire and runs on a 4Mb A3000 machine, with a 40Mb IDE drive and uses the PD RiscBBS software. Northern Arc BBS is now FidoNet node 2:258/100.0 and can handle calls at v21, v22, and v22bis 8N1 scrolling. Call (0709) 587341, 10pm-8am.

● Hull's Viewdata BBS CCl4 has a new number: (0482) 798249. The system runs on an Archimedes using Gareth Babb's Arc-VHost Viewdata BBS software, and caters for speeds from v21 (300bps) to v32bis (14,400bps), including v23 (1200/75bps) with MNP2-4/v42 and MNP5/v42bis data standards. CCl4 gives you an irreverent view of the world of Viewdata comms and comedy.

● Richard Paddle, sysop of Rich In Paradise BBS, has written several online games for use with the recently-introduced Doors facility in ARCbbs software. Richard must be a BT shareholder because his online games are deceptively simple, but extremely addictive. So far, three by-now traditional computer games are available for ARCbbs systems: *Snake*, *Boxed-In* and *Trivia*. The games programs are shareware, and for £5 each you get your BBS name hard-coded into the programs, which come with full instructions. Demo versions are available for download on The World of Cryton BBS on (0749) 670030.

● Owners of the new US Robotics 16K8 HST Dual Standard Modem having difficulty in the UK with it reporting 'Busy' when it should say 'Ringing', can now get the problem fixed by installation of upgraded firmware. Several improvements have been incorporated in the new firmware, which has to be factory-fitted. BBS sysops may be able to arrange a quick turnaround for the upgrade. Contact USR's service department on (0753) 811180.

● Call me with news or information by writing to: David Dade, BBC Acorn User, 101 Bayham Street, London NW1 0AG or by modem on Arcade BBS, User #2 - 081 654 2212 or 081 655 4412.

The Ultimate Expansion System

Many Acorn computer users are today finding that their expansion options no longer match the number of products which they might wish to add to their computers. This is also very much the case with new Acorn users who have purchased the A3010,A3020 or A4000 and are now only coming to realise the drawback of having only one expansion slot. The Ultimate expansion system pictured below on an A3000 covers all machines from the recent arrivals to the trusty A305. The system is based on a number of normal sized podules called 'MultiPodules'. There is a MultiPodule for every machine type.

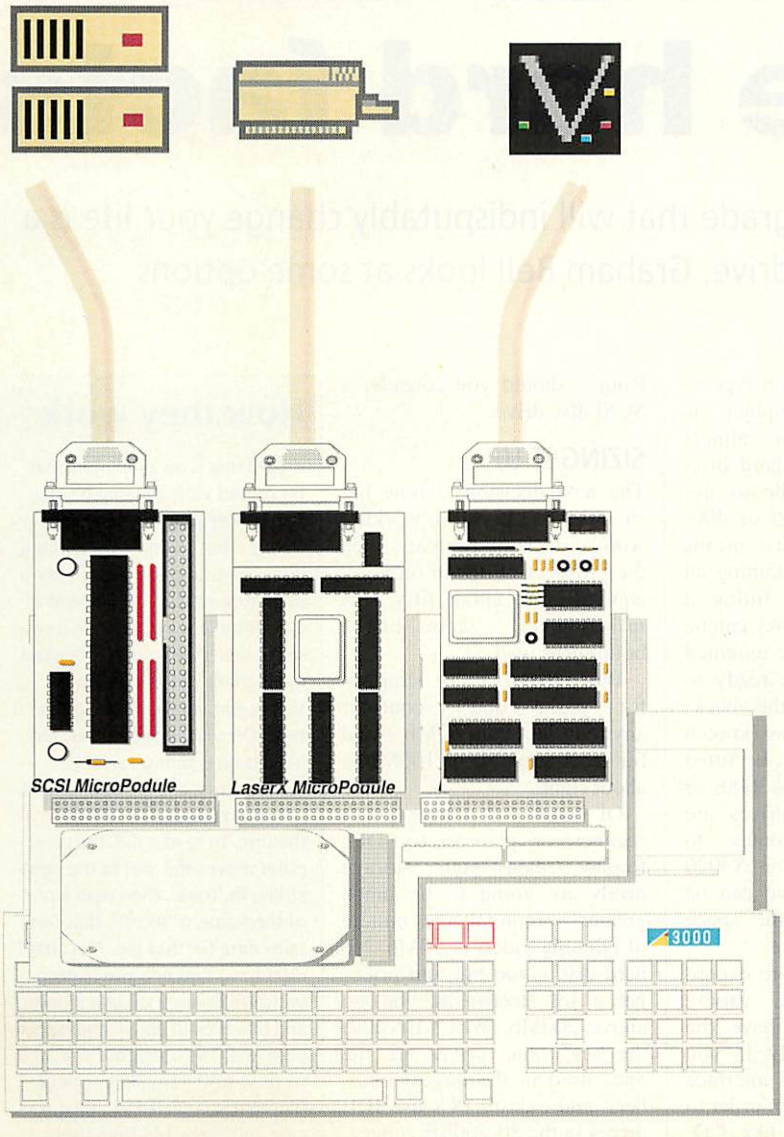
Miniature expansion podules called 'MicroPodules' can be inserted into the MultiPodule to provide interfaces to external devices. MicroPodules are approximately the size of credit cards and enable the User to add up to three interfaces inside their computer. The MultiPodules are self powered where applicable and have their own miniature fans for cooling thus removing any strain from the computer. There are a great number of MicroPodules in production and many more in development here at HCCS and also by other companies.

MicroPodules currently available:

- SCSI including CDFS
- Vision Colour Video Digitiser
- HiVision 508line Video Digitiser
- Analogue
- MIDI
- MIDI + HQ Sound Sampler
- Laser Express direct drive laser controller

MicroPodules coming soon;

- Hand Scanner
- Ethernet
- Video Out PAL Coder
- High Speed Serial Port



A3000	
Hard Disc Drives	
100Mb External	£479.00
200Mb External	£699.00
HardCard100	£429.00
20Mb IDE Internal with User Port	£179.00
60Mb IDE Internal with User Port	£269.00
Memory Upgrades	
1Mb RAM	£49.00
4Mb RAM	£129.00
Expansion	
Econet	£39.00
Serial Upgrade	£17.50
User/Analogue Card	£39.00
Podule Case	£15.00
Video Digitisers	
Mono Vision Internal	£49.00
Colour Vision Internal	£79.00
Colour HiVision Internal	£129.00
Mono Vision External	£62.00
Colour Vision External	£92.00
Colour HiVision External	£142.00
Ultimate Expansion System	
MultiPodule (3 slot)	£38.00
MultiPodule+20Mb+PSU	£229.00
MultiPodule+60Mb+PSU	£309.00
A5000/400/300	
Hard Disc Drives	
100Mb Internal SCSI	£399.00
200Mb Internal SCSI	£649.00
20Mb Internal IDE	£179.00
60Mb Internal IDE	£269.00
Memory Upgrades	
1Mb RAM for A400	£45.00
2Mb RAM for A5000	£89.00
Expansion	
Econet	£39.00
Video Digitisers	
Mono Vision	£49.00
Colour Vision	£79.00
Colour HiVision	£129.00
Ultimate Expansion System	
MultiPodule (2 slot)	£39.00
A3010	
Hard Drives	
20Mb IDE	£186.38
60Mb IDE	£271.49
Memory Upgrade	
1Mb RAM	£29.79
4Mb RAM	£126.81
Ultimate Expansion System	
MultiPodule (IDE + 2 slot)	£41.70
MultiPodule+20Mb+PSU	£220.43
MultiPodule+60Mb+PSU	£297.02
A3020/4000	
Memory Upgrade	
2Mb RAM	£59.00
Expansion	
Econet	£39.00
Ultimate Expansion System	
MultiPodule with User Port (3 slot)	£38.00
MicroPodules for Ultimate	
Laser Express	£249.00
Colour Vision	£79.00
Colour HiVision	£129.00
SCSI, with CDFS	£69.00
Analogue	£29.00
Colour Video Out	£49.00
Serial	£49.00
MIDI	£49.00
Scanner (Hand)	TBA

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ROBERT CLIFFORD

The hard facts

The only upgrade that will indisputably change your life is a hard drive. Graham Bell looks at some options

For many Arc users, a hard disc is *the* most desirable upgrade. Though expensive, a hard disc revolutionises the way you work: no more fumbling for the disc with your fonts on it, no more waiting while that big sprite loads.

There are three main options when it comes to buying a hard drive, each with a different type of connection to the computer. The oldest type is known as an 'ST506' drive: these are usually small, perhaps only 20 or 40Mb, and these were fitted to early A440s and A420s. New ST506 drives are getting increasingly hard to find. Their only advantages are that they can sometimes be acquired very cheaply at computer bazaars, and that they can be fitted directly to A410s because the necessary controller chip is already on the motherboard.

A more sensible choice now is fitting an 'IDE' drive. IDE stands for 'Integrated Drive Electronics' – this means the controlling circuitry, very similar to the ST506 controller, is built directly on to the drive itself. Such drives are used in most modern PCs, and in the A5000. There's even a tiny one in the A4 notebook. They are fast, reliable and affordable. However, the maximum cable length is limited to a few inches.

The third type is a drive that uses the SCSI connector – the 'Small Computer System Interface'. All Apple Macs use SCSI for their hard discs, but in the Archimedes range, only A540s come with these as standard. But SCSI isn't just a hard disc interface, it's a general high-speed connector and can be used for CD-Rom players, scanners, tape drives, and even a few printers.

CHOOSING A DRIVE

SCSI disc drives are slightly more expensive than IDE, because more intelligence has to be built into the drive itself, but foot-to-the-floor performance is pretty much the same as with IDE drives – in fact they are often identical mechanisms with a different controller. But SCSI has advantages: cable length isn't a problem, and because the drives are intelligent, it frees the main computer of some work. Choosing which type to add to your computer is straightforward. For almost everyone without a hard disc, the choice should be to use IDE. For older A300 or 400-style Archimedes, that means buying a podule containing an IDE interface, and fitting a drive internally. Or they can be bought with the drive mounted on the podule itself, ready to slot directly into the backplane: a drive like this (known as a 'hard card') can be fitted in five minutes. For A3000s or A3010s, tiny IDE drives are fitted on mini-podules to mount inside, and for A3020 owners, an IDE drive can be added directly, in the space below the floppy drive.

SCSI cards are more expensive than the IDE variety unless you already have the SCSI interface. Only if you already have a SCSI interface – or plan to buy one in order to add something else like CD-Rom – should you consider a SCSI disc drive.

SIZING IT UP

The next decision is how big should it be? If you're working with a stack of floppies, then the prospect of 40Mb on tap – equivalent to about fifty normal floppies – seems like a bottomless well.

But, unless you're strapped for cash, don't consider anything less than 60Mb – and for most users 80 or 100Mb is about right.

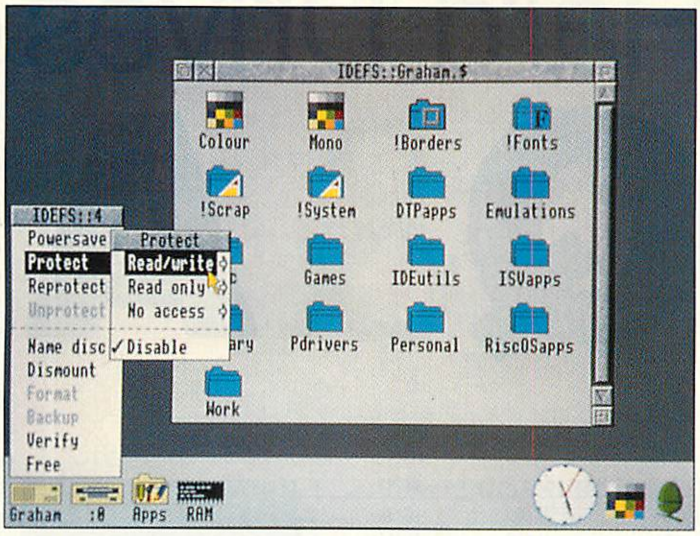
Of course, if you've got a scanner, or plan to try DIY Replay, then your storage needs are going to be much greater – remember a minute of editable video is 50Mb. No hard disc is too big, but prices get a lot steeper as you go above 200Mb. Why? Because the best value drives are the ones used in the largest numbers, and today's PCs use IDE drives in the 80-200Mb range.

How they work

A hard disc is an aluminium platter coated with a magnetic film. The platter spins at 3-4000rpm. Nearly – but not quite – touching it is a magnetic head, much like a miniature version of the head of a cassette tape recorder. In a cassette, data (the sound) is marked in magnetic patterns, in four stripes running right along the tape. On a hard disc platter, the head is on a springy arm that moves across the platter, to read patterns recorded in stripes on the disc. To read a file, the computer moves the arm to the right stripe, or 'track', then read a part of the stripe, a 'sector', that contains data for that file. Most hard discs have two or more platters with 300 or more circular stripes, and heads both above and below each one. The heads are tiny, and so close to the fragile magnetic film that it is sealed in a dust free case and protected from shock.

Wizzo

Supplier: ICS
Tel: 051-625 1006
Price: £29



Ian Copestake Software was the first company to release a tiny internal IDE hard disc for the A3000. Cute as a button, and long before Acorn used IDE in the A5000, A4 and A3020. Now ICS' IDE filing system is available as an upgrade for A5000 and A4 owners, under the Wizzo moniker. I fitted Wizzo to an A5000 with Risc OS 3.11 and a 120Mb Conner disc.

Wizzo arrives as a single Rom and a generic manual aimed at purchasers of Copestake's disc drives. The Rom is innovative: A5000s and A4s have a Rom slot marked '5th Column', meant for installing patches to the operating system, and it's into this that the Wizzo Rom fits – the first product to do so. There's a single link to change, and you're ready to go. Well, not quite – the manual says put the Rom in the lower 28 of the 32-hole 5th column space, 'leaving pins 1, 2, 31 and 32 free'. The pin numbers aren't marked on the circuit board, so you need to know that pins 1, 2, 31 and 32 are the four nearest the notch in the socket. And did you remember to disable Risc OS' own IDE filing system? You have to use Configure to switch off the Risc OS IDE system, and if you don't, your machine won't boot up properly.

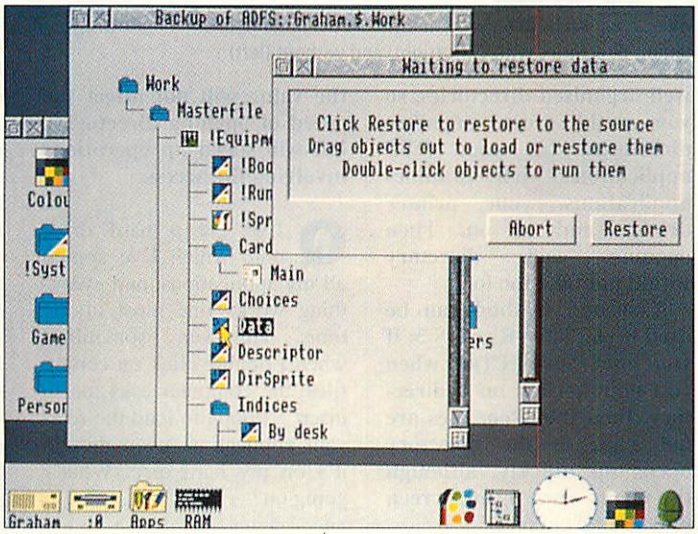
That dealt with, what's new? Well, for most users, not very much. Wizzo does all the right things, like showing the disc name underneath the icon, and appearing in the right icon group. The ads talk of speed barriers being broken, but when loading and saving or using desktop multi-tasking operations, speed differences between Wizzo and the standard Risc OS system were miniscule. Wizzo claims the ability to work under interrupts if IDEBuffers is configured to anything other than zero, which should speed up desktop filer operations, but, when tested, it crashed the machine when copying directories.

More useful are the security and partitioning options. If you are prepared to re-format your hard disc, you can partition it using the utility supplied. You choose the sizes of the partitions when you format the disc. You also set access limits (read-only or no access) on the partitions, with an override so you can write to a read-only partition if you have the password. Partitioning is useful if you have a giant disc: part of Risc OS (the *Filecore* module) has a 512Mb limit, so a one gigabyte disc costing close on two grand is half wasted. £30 for Wizzo gives you access to the other half – a bargain!

When buying a new IDE disc, I'd definitely have Copestake on the shortlist. But as an upgrade for the existing A5000 IDE filing system, Wizzo doesn't offer enough to make it worth the money.

Visual Backup

Supplier: Dabhand Computing
Tel: 061-766 8423
Price: £42.51 plus VAT



Discs die. Not, it must be admitted, as frequently as they used to. Modern hard discs run, on average, for ten or twenty years without fault. But beware: half the discs out there are below average. So when will yours fail? And will you be ready?

Realising that backing up data is a chore, Dabhand Computing has launched *Visual Backup*. It makes the chore as pain-free as possible. Installing the utility on your hard disc is pretty simple, and it checks for the original floppy only the very first time you use it.

There is a huge, scrolling preferences dialogue, but everything in it can safely be ignored if you're backing up to floppy. On running, it takes a couple of minutes to build a tree display of your hard disc's folders and files, then allows you to choose which to backup by highlighting files or whole folders. *DiscTree* from Mitre Software worked in a similar fashion, but never made it to Risc OS 3.

Visual Backup competes head on with Risc Developments' *Hard Disc Companion*. In performance terms, there's little to choose between the two, with *Visual Backup* a short neck ahead in speed and compression efficiency on a selection of test runs that I performed. There are a couple of differences, though. Unlike *Visual Backup*, *Companion* doesn't format new discs as you go along, and it sidesteps the backup of PC data – *Visual Backup* allows you to choose either of two ways to safeguard your PC partitions. And it shows very clearly the progress of the backup, where *Companion* provides only a flawed estimate of time to go. However, *Visual Backup* uses the preferences dialogue to select things like the backup destination, which is less convenient than *Companion*'s menu option. You can't save several configuration files for regular backup tasks as you can with *Companion*, and the standard edition of *Visual Backup* won't deal with networks or incremental backups (files changed since a date or since last backup).

Sadly, neither can deal with SCSI tape-streamers, nor can they be run totally from a script file for unattended night-time backup sessions.

On backup features, *Visual Backup* is a little behind, but it scores heavily on ease of restoring lost data. Its directory tree display is much better than *Companion*'s search dialogue. You can drag files and folders out into normal Filer windows to retrieve them, or restore a whole disc.

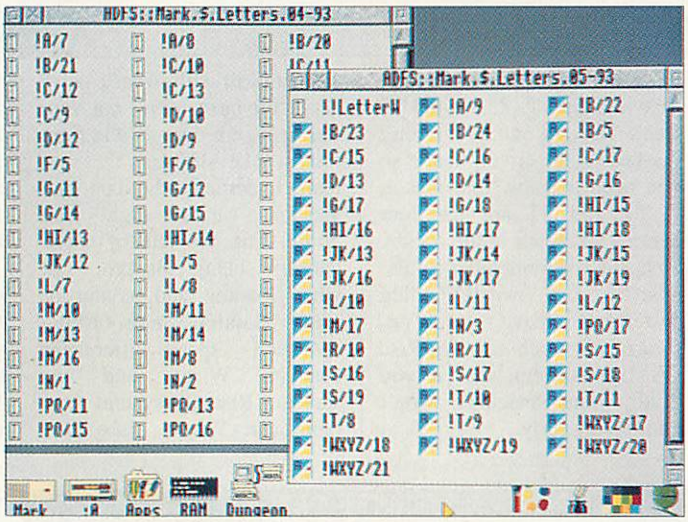
I'd choose *Companion* for the ability to save several configuration files and do incremental backups, but then I have both hard disc and network directories to backup. For a hard disc-only machine, then the ease of choosing and restoring files from the tree display might tip the balance.

Hard Drives Q&A

Q I have been having verification problems with my hard drive, and I heard that I could help reduce corruption by cleaning out the fan filter in my drive. What does this mean, and is it advisable?

A The only fan filter that you should be changing in a hard drive is that used to cool the case of an external drive; you should never prise open the actual hard disc, despite that fact that there are filtered holes in the hard disc case.

Hard discs do have a fan of sorts inside them, hence the whirring sound when turned on. The discs have a hollow vertical shaft on which the platters rotate, and as they spin, air is drawn up the shaft and is blown over the discs so the read/write heads float above the surface on a cushion of air. Hard discs are assembled in completely dust free environments, so it is very unlikely that the corruptions are due to dust in the disc; it is more likely to be wear and tear or magnetic disruption. Opening a hard disc's case is guaranteed to destroy the hard disc completely.



Opening directories with CTRL (right) and without (left)

Q I have got a directory full of *Impression* documents which takes ages to open when I double-click on it. However opening it a second time takes a lot less time. Can I avoid this delay, possibly by altering some of the *ADFSBuffers* values in the configuration settings?

A Whenever a directory is opened for the first time, then any applications inside that directory will be booted; in other words, the *!Boot* file inside the directory will be run. This normally loads the sprite for the application (the one displayed in the Filer window), as well as setting any filetypes necessary. As you can imagine, if there is a large number of applications in a directory, then this process can take some time.

However, there are ways of avoiding this. The first and most obvious solution is to split your hard disc up into well organised directories, so you could create separate directories for your DTP applications, your graphics applications, your printer drivers and so on. Then opening each directory would not take too long.

A second method can be used if you have Risc OS 3; if you hold down CTRL when you double-click on a directory, then the *!Boot* files are not run, so the directory opens up quickly, although the icons shown on screen may not be correct.

The reason that the second opening is quicker than the first is that once a *!Boot* file has been run, it is not run again; the Filer knows not to re-run the file as a sprite with the same name as the application has already been loaded.

Changing ADFSBuffers will not remove this problem. ADFSBuffers are simply used to cache data to be written to open files so changing the value will not affect the speed of opening directories, but will speed up operations involving file access.

Q I've got a hard drive onto which I've copied all my applications, and everything works fine most of the time. However, sometimes when I double-click on certain files, the computer asks me to insert a floppy to load the relevant application, even though it's on my hard disc. What's going on?

A The chances are that you haven't set up your boot sequence properly (or you haven't got one), and the computer isn't actually aware that the relevant application is on your hard disc. As the computer is asking for a particular floppy, it's probable that you will have put that in the drive and clicked on the drive icon, and that floppy will contain a copy of the application you are trying to load. The computer will then have 'seen' the application, so when you double-click on the file, it asks for the floppy so it can load that application.

To avoid this, you should set up a boot sequence on your hard disc by saving a file !Boot in the root directory, after opening the directories on your hard disc which contain file-loading applications.

Now, when you switch on your machine, the boot file will be run, and your computer will know where it can find any applications it needs to load.

Q I've got an A3010 which I want to expand with a hard drive, but I also want to expand my memory. Should I go for the memory expansion first, as I can't afford to buy both in one go?

A The problem is that as soon as you have installed your hard drive, you will have far more applications within easy reach so you will need the memory to use them. Trying to multitask applications in only 1Mb of memory can be quite a struggle, though the inclusion of Acorn's main applications in Rom in Risc OS 3 does help to cut down on memory usage.

On the other hand, if you upgrade your memory, then to make the most of it you'll probably want to run a few applications concurrently, which means a lot of disc swapping if you have a floppy-only system. Also, if you are using lots of applications together, then any data transferring between them will normally access the scrap directory, which can be very sluggish on floppy disc, and does slow you down.

If I had to make a choice, then I would probably go for the hard disc; I've found that having a hard disc transforms the computer into a much more powerful and usable machine, probably more so than a Ram upgrade on its own. However, when you have a hard disc, you will definitely want a Ram upgrade straight away if you really want to use your Arc.

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Last week the Express reported on the complaints of

management of Edgeley branch was not aware of

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"The cage in which aluminium cans are stored was

SCHOOL CHILDREN PROVE THAT NEW BYPASS WILL DAMAGE THE LOCAL ENVIRONMENT

EXCLUSIVE

BY MATTHEW DAVIES

USING an innovative new program on their classroom computer children from St. Chad's School have shown town planners that a proposed new bypass would have a detrimental effect on their local environment.

The children surveyed the local area and fed details into their Topographer program, which allows them to look at the relevant area in 3D. They then added the new road along its proposed route and it became obvious that the road would not only affect an area renowned for its badger population but would also distract children in the classroom as they would be able to see traffic moving along the new road.

The children even went as far as to propose a new route for the road to the town planners. The proposed route would have a negligible impact on the area but still provide the much needed relief to existing roads.



A SERIES of sweeping proposals which would abolish free parking in district shopping centres, change some bin collections, increase lettings charges and scale down mileage claims by some council officers, have been announced by Labour.

In the first indication of their intentions si seizing power jointly with the Conservati party has produced a b 1,000 serv

● REDUCING mainten

Other econ departmental b cutting scho fees.

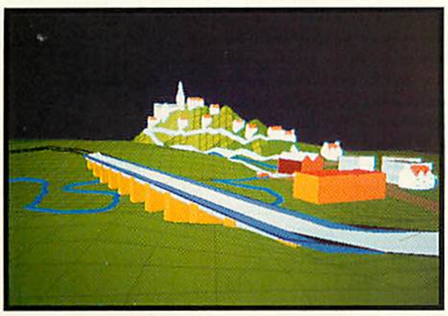
Th

Topographer is a major application for the Geography curriculum which allows children (and teachers) to have lots of fun whilst learning all about maps, contour lines, valleys, rivers etc. In fact *Topographer* covers virtually all items found on a map.

The real break through with *Topographer* is its 3D section which allows you to convert a 2D map into a 3D model on screen. Imagine turning a set of flat contour lines on a 2D map into a 3D model which clearly shows the hill — no more cardboard cut out models or papier mache! You define where you look from, and what you look at.



Topographer also covers aspects of the IT and maths curriculum with its modelling capabilities. Just stop for a minute and think of the projects that you could do with *Topographer*. You could make a map of the local area with churches, pubs, woods etc. and then view it from various places. If there is a bypass proposed you could add it in to the existing landscape and see where it is visible from and what impact it is likely to have on the community. I'm sure you can think of a hundred and one topics.



◆ Fully RISC OS 2 & 3 Compliant and 1 megabyte friendly ◆ Suitable for all ages from 6 onwards ◆ Easy and quick entry of all symbols (over 100) ◆ Wooded areas which translate into impressive 3D landscapes ◆ Definable map size and scale which can be linked to the national grid references ◆ Powerful 3D mode giving a true representation of the landscape ◆ Stunning 3D models which can be saved as a sprite file for use with other applications.

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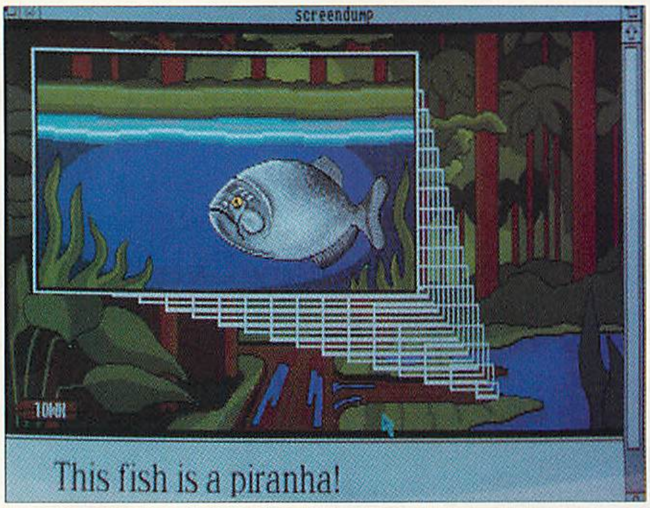
Acorn

For further information please send S.A.E. to ACORN WORLD, C/O EXHIBITION PLANNING SERVICES, PO BOX 162, STAINES TW19 5JX or telephone 0223 254441.

ACORN'S VOYAGE OF DISCOVERY

THE Discovery pack featured on our main news pages has been designed in conjunction with educationalists as a one-stop solution to primary school's IT needs. It is built around an A3020 computer and includes Acorn's integrated package, *Advance*, Sherston Software's *Crystal Rainforest*, an adventure game and turtle Logo package, and Longman Logotron's *Magpie*, a multimedia authoring system. Other additions include two primary fonts and *Replay* video clips. There is also a *Magpie* application which introduces the user to Discovery. It includes a suitcase of goodies such as a heat sensitive mouse mat which reveals hidden pictures, an audio training tape, vouchers giving discounts on educational software and hardware and a wealth of curriculum materials. Project frameworks on Egypt, Ourselves, Planet Earth and Our Precious Planet are included. Both NCET and SCET have included contributions by mapping the National Curriculum and Scottish 5-14 Curriculum attainment targets to the software in the pack.

The price is £1149, considerably cheaper than Research Machines' Window Box. Further details from Acorn on (0223) 254254.



Discovery has plenty of software for you to get your teeth into

FAIR SWAP

4CLASS is a new computer program to assist teachers in the key elements of the National Curriculum. The structure of the software was generated by teachers and developed in schools over a two-year period.

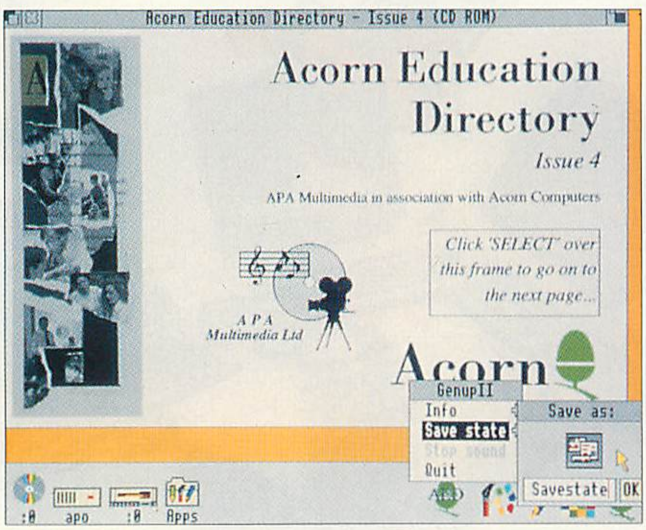
It is designed for simple use by classroom teachers rather than administrators. It enables teachers to personalise reports, report progress for a given period, devise curriculum themes and schedule activities.

The basic elements include student registers, subject files and mark-books and it comes complete with subject files covering all NC subject areas. Output from the software can be designed as required.

Priced at £170 for a site licence it may prove a little expensive for small primary schools but could appeal to larger schools who are struggling to cope with the administrative demands of the National Curriculum.

Further details are available from Class Software on (0703) 228761 extension 2273.

EDUCATION DIRECTORY



The Education Directory features more than 2000 titles

ACORN has finally released its *Education Directory* on CD-Rom. The CD contains details of well over 2000 educational software titles, from more than 200 companies.

All of the entries are accessed through an easy-to-use graphical database allowing keyword searching for companies or software types. The user can also be transported to linked pages of information with screenshots, or software demos.

The CD-Rom offers resources such as sound samples and sprites that can be extracted and then used in other applications.

The CD-Rom is free to education users. For further details call Acorn Computers Ltd on (0223) 254254.

News in brief

● Sherston Software has announced that it has reached an exclusive agreement with Chatsworth Television, producers of *The Crystal Maze*, the Channel Four adventure game programme.

Sherston will be launching an Archimedes version of *The Crystal Maze* at the Acorn World show at Wembley in October. Further details are to follow.

● In an aggressive piece of marketing targeted at its core education market, Acorn has announced a scheme which is to allow UK schools to trade in their old computers for Acorn 32-bit machines.

Acorn's XChange scheme, which runs initially from 24 May to 30 June, will give trade-in prices of £50 off an A3020, or £100 off an A5000, in exchange for computers of any make, and in absolutely any condition.

According to Peter Talbot, Acorn's general manager for education, the computers can be 'Spectrums, ZX80s or 186 machines for example; but we'll accept anything from a ZX80 to a Nimbus 488 PC.' For details, call Acorn on (0223) 254254.

● Acorn's Chris Morley is to speak at the forthcoming Multimedia in Action for Education exhibition, which will take place on 8 and 9 July at Alsop High School in Liverpool.

The event aims to highlight the benefits of multimedia technology as a teaching resource. Features of the event will include seminars and hands-on demonstrations of multimedia systems in actual classroom settings.

Official support for the event has been won from the NCET. For more information, contact Rubicon Events on the following number: 061-429 9448.

● If you have any educational news or views contact us at the following address:

Education Page, BBC Acorn User, Redwood Publishing 101 Bayham Street , London NW1 OAG

Clare Johnson, AEC manager

EDUCATION WAS NEVER THIS MUCH FUN

Noddy's Playtime is a graded creativity and entertainment package for home computers based on solid educational principles for 3-7 year olds.

Drive with Noddy in his car and explore the magic of Toytown, visiting the 8 special learning locations.

- Railway Station - memory game
- N&B Works - observation game
- Chimney House - musical fun
- Noahs Ark - jigsaw puzzle
- Farm Yard - animal matching
- Market Place - letter recognition
- Post Office - counting
- Police Station - maze game

Also included is a junior Art Package which develops your childs creative ability.

- Picture Colouring.
- Electronic 'fuzzy felts'.
- Freehand drawing with pens and spraycans.
- 50 pre defined fill patterns.
- One finger on, one finger off mouse control for tiny hands.

Noddy's Playtime features user friendly icons so that even the youngest family member can learn and have fun.

There is a choice of 3 carefully defined learning levels designed in consultation with teachers. Noddy's Playtime also includes FREE: Toytown map, keyboard overlay and wobbler. A comprehensive manual and parent teacher guide will enable you to bring your childs imagination to life.

RISC OS 2 + 3 compatible







IBM PC screen shots

NODDY'S™ PLAYTIME

THE JUMPING BEAN CO.

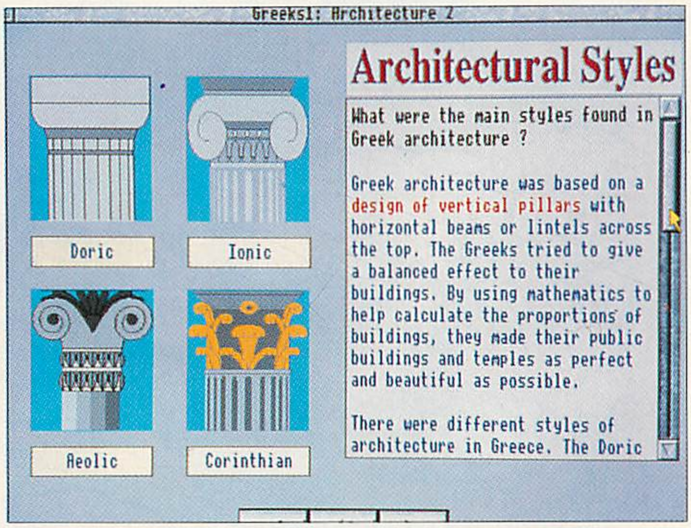
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Tel 0602 792838 Fax 0602 780963

THE GREEKS

Supplier: Hampshire Microtechnology Centre
Tel: (0705) 378266
Price: £42.95 (site licence included)

It may all be Greek to you and me but for Key Stage 2 pupils Ancient Greece is now a compulsory history National Curriculum core study unit. Consequently, several packs have recently been published on this theme, but this is a particularly well-compiled set of materials which children will enjoy using.

There are four discs in this *Genesis* application. The first is the startup disc which you must re-insert each time you want to load one of the other discs. These contain study units covering the architecture, warfare, city states, economy, beliefs, lifestyle and sport, crafts and entertainment, myths, legends and legacy of the ancient Greeks.



The Greeks couples strong illustrations with detailed and unpatronising text

Each unit consists of several screens of information accompanied by simple illustrations. The text is commendably detailed and doesn't talk down to this age group. The data is followed by a series of true or false questions which test how much information pupils have taken in. A correct answer to certain questions triggers the reward of a Greek coin and the pack also contains a photocopy master of these, so teachers can actually hand them out if they want to.

Good touches include a dictionary which can be accessed from the information screens, and some of the words listed are even read aloud by the computer, although the pronunciation is rather synthetic (perhaps this is what an ancient Greek accent sounds like).

Also in the pack is a set of 30 worksheets. Again, these

PrimeWord

Supplier: Minerva Software
Tel: (0392) 437756
Price: £59.95 + VAT

PrimeWord is the latest program in the Minerva Software's *Prime* series, following on from *PrimeArt*. Being totally Risc OS-compliant, *PrimeWord* loads in the normal manner and clicking on its icon loads the empty, default document window.

The working window provides a range of button icons at its top (the button bar), while the writing area is banded by rulers containing two vertical and two horizontal tabs and text margins. Altering any of these is simply a matter of dragging back and forth until the desired positions are reached. Text under the ruler's influence is immediately affected.

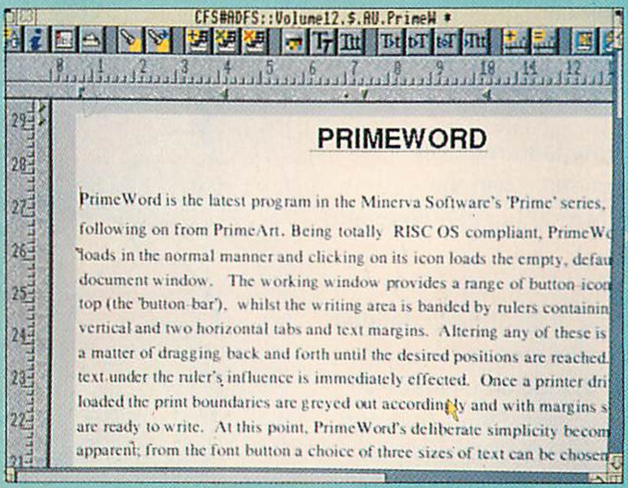
Once a printer driver is loaded the print boundaries are greyed out accordingly and with margins set you are ready to write. At this point, *PrimeWord*'s simplicity becomes apparent. From the font button three sizes of text can be chosen: small, medium and large, accommodating headings, subheadings and body text.

The program can make full use of Acorn's font manager yet is able to appear with a limited range of sizes and fonts – the sizes being preset for specific requirements. Indeed, the ability to configure all of *PrimeWord*'s facilities to suit a wide range of users with differing levels of ability is one of its major attributes.

Initially, the 20 or so buttons on the button bar appear rather confusing, especially when beginning with the wordprocessor. However, clicking the Menu button on the mouse while on the button bar produces a textual menu.

If this isn't enough, the function keys perform the most frequently repeated tasks and the program uses Acorn's interactive help application. Somewhere there is a mode of working which will suit all tastes. Furthermore, many of the keyboard short cuts follow what is rapidly becoming the *de facto* standard, such as CTRL-X for delete, and CTRL-S for case change, all of which helps shorten the learning curve.

All the usual features associated with a modern wordprocessor are present: full page formatting and instant reformatting, headers/footers, full WYSIWYG display. In addition, *PrimeWord* has a number of features not normally associated with a simple wordprocessor. There's the ability to import sprites and *Draw* files, a full spelling checker with a 50,000 word list and a mailmerge facility including CSV file support.



Importing pictures is simply a matter of dragging items onto the working screen. However, instead of repelling text, the picture overlays it and clarity is compromised. This shortcoming is surprising in an otherwise sound bit of programming as even NW Semerc's *Phases* enjoys this basic facility. The spelling checker performs as expected although the mailmerge accepts data from Minerva's *DTOBase*, *Multistore* and *Flexifile* while all other database programs must provide CSV format files. To place CSV data into fieldname areas in the text, there needs to be an exact match, which calls for careful organisation of file structures. I wonder how many users would actually use this and whether features like hyphenation may not have been more suitable.

One of *PrimeWord*'s most useful features is its ability to offer customised versions. From a setup menu items on the button bar can be selected to appear or not and the spelling word list can be selected to load automatically. *PrimeWord* should find a niche in education, but I would encourage anyone taking the plunge to look carefully at *Pendown* and *Pendown Plus* (from Longman Logotron, cost £54) and *Startwrite* (from Icon Technology, cost £72).

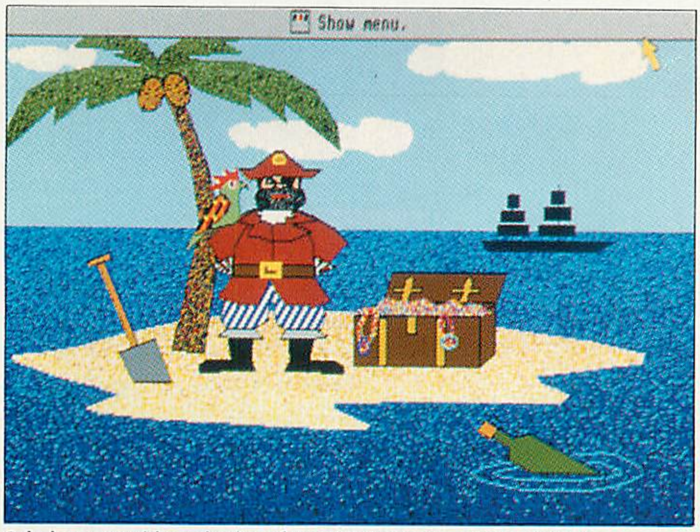
PrimeWord is the most Risc OS-compliant software Minerva has produced. It has a number of delightfully easy-to-use features and should appeal to many new Archimedes users who are starting out for the first time.

Chris Drage

test pupils' knowledge but also ask them to solve anagrams, do word searches, design their own Greek columns, and point them towards activities away from the computer.

The presentation of *The Greeks* is attractive enough, although the bottom inch of the screen was cut off on my monitor and pages wouldn't always disappear when I closed them.

The emphasis is firmly on hard learning, on absorbing facts, but that's in line with the National Curriculum, and this pack certainly provides enough material for teachers to tackle Ancient Greece in depth.



Splash comes with a selection of sample pictures to get you started

SPLASH

Supplier: Sherston Software
Tel: (0666) 840433
Price: £19.95, site licence £39.90

ARTSCHOOL

Supplier: Micro Studio
Tel: (0353) 624997
Price: £29.95 (includes site licence)

To say these two primary art packages are almost indistinguishable is not a criticism, it's just that they are based around similar sets of functions and tools and which one you prefer probably comes down to personal taste.

ArtSchool is designed to run on 2Mb machines but if you only have 1Mb it will still work as long as you aren't using Risc OS 3. *Splash*, on the other hand, requires just 1Mb. With a rudimentary knowledge of art packages, both programs can be picked up quickly and easily. However, if you need help getting started, the *Splash* documentation is 'cleaner' and the type size bigger.

An extensive set of clip-art accompanies *ArtSchool*. This is a bonus but perhaps a little superfluous in a program for this age group, where the emphasis should be on children's own creativity. *Splash*, on the other hand, has a selection of sample pictures, which could inspire pupils and show them what is possible.

If it's a question of price, Sherston has the edge for single users, and Micro Studio for site licences. Sherston also provides programs on 28 days approval, so if you try the package and don't like it, you can always send it back. On the other hand Micro Studio offers a demo disc for £5: refundable if you buy the program. The choice is yours.

NEW ROAD

Supplier: Norfolk Educational Press
Tel: (0603) 33276
Price: £20 (plus £3.50 p&p), site licence £5 extra

This pack is described is a 'decision-making activity' but it's essentially an old-fashioned simulation.

Aimed at Key Stage 3 and 4 Geography, the brief asks students to decide where a road should be built to bypass the town of Wimborne Minster in Dorset. To do this, they consult a textual and visual database, authored using *Magpie*. You don't need *Magpie* to run the package as it permits read- but not write-access.

This is a very simple resource consisting of a sturdy ringbinder, the database on disc, a few pages of teachers' notes and ten copies of the appropriate section of the 1:50,000 Ordnance Survey map of the area under scrutiny.

New Road is closely targeted but it is good, and if it will support your teaching, get hold of a copy.

Alice Smith

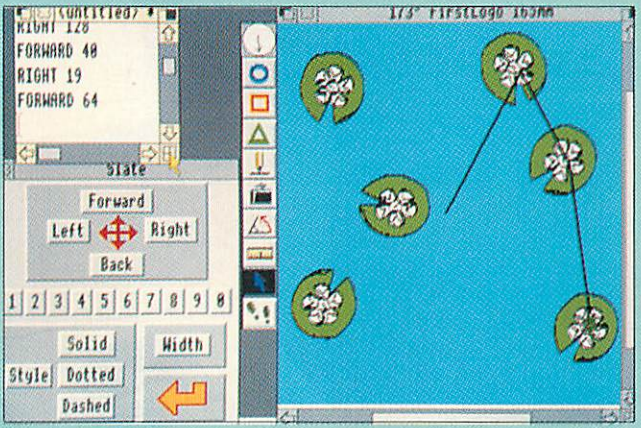
FirstLogo

Supplier: Longman Logotron
Tel: (0223) 425558
Price: single user £24, site licence £72

Just as the debate and legal proceedings about what constitutes *Logo* is hotting up, along comes *FirstLogo* to add fuel to the fire. I say that because one thing *FirstLogo* isn't is *Logo* – at least, not in terms of the list processing language. *FirstLogo* is the first fully Risc OS-compliant, multi-tasking, desktop *Logo* application and doesn't pretend to be anything other than an introduction to *Logo* proper.

FirstLogo has a number of novel aspects: a *Logo* script can be created by simply dragging the pointer (which can be defined as a turtle or a mouse) around the graphics window. Once a set of commands is completed in the Notepad window it can be marked with the mouse and saved as a procedure. Saved procedures can be loaded, complete with attendant subprocedures and executed immediately. Repeats, colour changes, line size, style and width can all be used in the script.

A commands 'slate', from which whole word input is available, means children do not, at any time, have to resort to the keyboard to produce visually exciting designs. A toolkit provides circle, square and triangle shapes (hollow or filled) which can be sized and rotated like *Draw* objects. An angle measurer and a ruler can also be selected. Other surprising aspects of *FirstLogo* includes its totally Risc OS-compliant editing menu from which script can be copied, moved or deleted, and



the ability to drop sprites onto the screen as backdrops.

The term *Logo* in *FirstLogo* is a little misleading. It could suggest that *Logo* is only about turtle graphics, when in fact it is chiefly a very powerful list processing language used in a multiplicity of programming roles including, for example, control technology.

However, *Logo*, as described in the National Maths Curriculum, is just as confusing so perhaps in the interests of accuracy each should have used the term 'turtle geometry'. This aside, *FirstLogo* lets children create complex and appealing designs with the minimum of fuss.

Chris Drage

QUALITY & SPEED

The BJ-200 and BJ-230 are the latest black and white printers from Canon, the market leaders in bubblejet technology.

The BJ-230 is an A3 version of the popular BJ-200. Both printers come with a built-in 80 page sheet feeder and power supply. With a print density of 360dpi the print quality of both these printers is hard to distinguish from a laser printer and better than any other competing black and white inkjet printers. A sample A4 print out is available on request so you can make the comparison. And like all inkjet printers they are whisper quiet and both easy and cheap to maintain.

Both printers are supplied with Computer Concepts' super-fast TurboDriver printer drivers - printing and returning control on average between three and ten times faster than the standard Acorn drivers or the Ace PROdrivers. The RISC OS 3 versions of the TurboDriver also support rotated text and sprite printing, multiple printer icons on the icon bar and full PostScript style control over halftone screen density, screen angle and screen type. They can also handle 24 bit CMYK colour separation and so colour prints can be obtained by using colour inks and passing the paper through four times.

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THE REVIEWER'S OPINION

" This is probably the best inkjet printer yet. ..whether used on its own or with the excellent TurboDriver, the BJ-200 is a fast printer and the print quality is simply superb. A winner."
Acorn User

" The TurboDriver excels at its task of providing quick, high quality output.."
" .. In my opinion it is well worth the money and will more than pay for itself in terms of better productivity."
Acorn Computing



NEW A3 MODEL NEW LOW PRICE

NB: The BJ-230 is only suitable for use with RISC OS 3.1. The BJ-200 can be used with both but please specify which will be used at the time of purchase. Suitable for all models of Archimedes, but a minimum of 2 Mbytes of RAM is required.

Computer Concepts Ltd

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BEEBUG SUMMER OPEN DAY RISC developments

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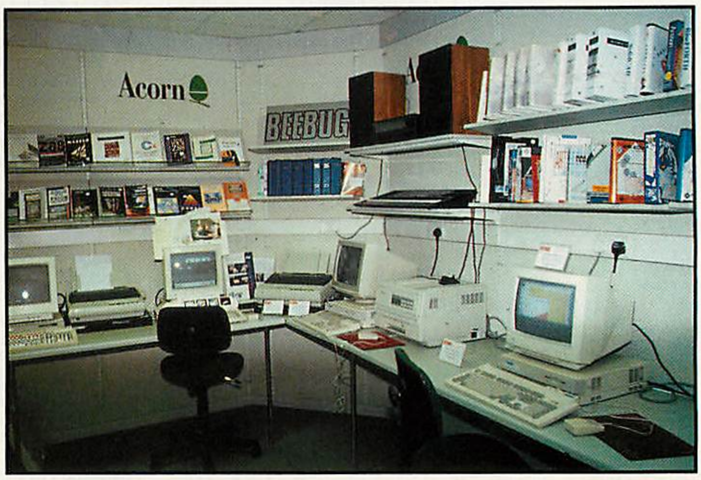
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£150 off an A5000 Learning Curve *(inc VAT)*
£160 off an A5000 HD120 *(inc VAT)*
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Extra discount on all RISC Developments hardware and software bought on the day plus many other special offers - just for the day.



Launch of OCR and 'EASY C'

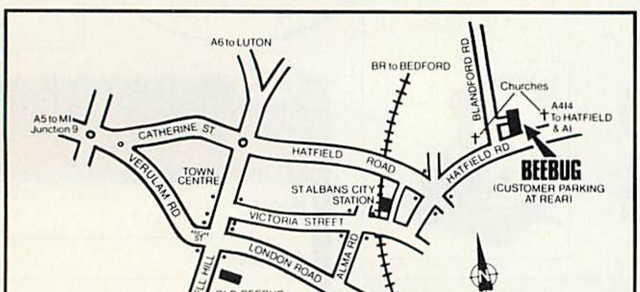
RISC Developments will be launching their new 'Easy C' programming package and 'Sleuth' OCR (Optical Character Recognition). These will be of great interest to many people and staff will be on hand to demonstrate and answer questions.

Many Exhibitors

The entire premises of BEEBUG will be available on the open day. BEEBUG and RISC Developments own staff will be joined by representatives from Acorn Computers and Herts IT (the Hertfordshire Acorn Education Centre). Major companies in the Acorn marketplace including Colton, Cumana, Computer Concepts, Longman Logotron, Minerva and Sherston will be showing their latest products and Acorn Computing will be publicising their magazine.

Acorn in the Home

If you are interested in using a computer in the home, then come along and try the latest range of Acorn Archimedes computers and see for yourself the vast range of software available from exciting games to sophisticated DTP packages. There will be many staff on hand to demonstrate software and provide advice. Try the computers 'hands - on' for yourself without obligation.



Acorn in Education

Acorn computers are used in more schools and colleges throughout the country than any other make of computer. We will demonstrate the speed, versatility and power of Acorn Archimedes computers and the wide selection of software available including the new Advance and Discovery packages. The new Acorn CD Multimedia Unit will be on display and we will have an Ethernet network set up for you to try.

Acorn in Business

Come and see the capabilities of Acorn computers for business. See the latest PC cards in action and the vast array of software covering DTP, word processing, spreadsheets and database handling.

Magazine Products

Come and find out about RISC User magazine and see the range of magazine products including software on their highly acclaimed magazine discs and other books which they publish.

There will be plenty for you to see, so make a day of it.

How to find BEEBUG

By Car - St Albans is easily reached from A1, A5, A6, M1 and M25.

By Train - We are 10 minutes walk from St Albans City Station on the Thameslink Brighton to Bedford line through Kings Cross.

BEEBUG, 117 Hatfield Road, St Albans, Herts, AL1 4JS. Tel: 0727 840303. Fax: 0727 860263.

The world to come

The Acorn World show, sponsored by Acorn User, is poised to become a yearly showcase for the entire range of Acorn developments. Sebrina Terl, from Acorn Computers reveals some of the latest plans

Acorn Computers takes part in over 100 different events and exhibitions around the globe every year but for most users, the highlight has always been the annual *Acorn User* Show, held in London in the autumn.

This year things are different and Acorn users now get two bites of the cherry. April saw the first *Acorn User* Show in Harrogate, aimed squarely at attracting the many Acorn fans in the north. 5000 people crammed through the doors of the Conference Centre and made the show an even greater success than everyone had hoped. With the show organisers already taking enquiries about next year's show, it seems that Harrogate will establish itself in the Acorn calendar as strongly as Wembley has done.

To continue in the footsteps of the original *Acorn User* show in London, an even bigger Acorn show is planned for Wembley this year. *Acorn World 93* will take place at the Wembley conference centre with *Acorn User* as sponsors of the show.



Wembley Conference Centre: venue of Acorn World 93

Show details

Acorn World 93 will kick off at the Wembley Conference Centre in the largest of the halls – Hall One – on Friday 29 October and the final whistle will blow on Sunday 31. So far over 50 exhibitors have booked stands, but for the final show there should be over 100 exhibitors. For further information contact (0223) 254441, or write to the Acorn World ticket office, PO Box162, Staines, TW19 5JX.

A WIDER AUDIENCE

Acorn marketing director, Mike O'Riordan explained the philosophy behind the show. 'Whereas in the past the *Acorn User* Show has rightly aimed at attracting existing Acorn owners from the enthusiast to the technical whizz kid, Acorn now has to spread its net. Acorn World will reflect our business developments and will reach out to an even wider group of people.'

Kevin Coleman gave a taster of what people could expect. 'Many users come to a manufacturer's show to see new products, but our customers know there is more to us than this. Last year we launched 15 new products, but there obviously won't be another 15 in 1993. However, what *Acorn World* will allow us to do is to give a pointer to our future.'

Acorn plans to have a sizeable stand at the entrance to the show to show off their main products but, as well as the main stand, there will be three feature areas which focus on education, printing and home leisure.

The Acorn in Education Centres initiative has been an attempt to nurture IT centres rather than let them wither away. At the show Acorn will be working in partnership with some of these AECs to handle questions from teachers, students, governors and parents.

PUBLISHING AREA

The publishing area will also be an important part of the show. Unless you work in the pre-press or printing industries, you may not know that Acorn is making strides into the publishing market across Europe. *Acorn User*, will be showing the printing operation in action in a dedicated publishing area. The result will be a printed news flyer with the latest information on the show.

GAMES AREA

In the home entertainment market, software developers have already come to realise that there is great potential to increase their business by writing software for the Archimedes platform.

Since entertainment is such an important area, there will be a special games area. Many of the new releases will be at the show. Watch this space for more details.

In addition, there will be a theatre area with a seminar programme. Naturally Acorn will use this theatre as a focus for exploring new directions for the existing technology, but will also hope to keep the fun elements.

Topics on the agenda include a seminar on how to produce a pop demo, incorporating music and video. A printing bureau will be telling users how to get their DTP output to a wider audience.

There will be advice for schools on how to produce an electronic prospectus and, for the technically minded, Arm Ltd will give a presentation on its latest developments. For full details of the seminar program, see next month's *Acorn User*.

NEW EXHIBITORS

Acorn has also been working at plans to attract a new group of exhibitors to the show. The company has recently seen several projects come to fruition, working with companies such as Psion and ABDick and these new partnerships should be reflected at the show.

For more details on special events see next month's *Acorn User*.

Village people

Silicon Village is a bulletin board with a difference. Mark Moxon takes a stroll on the village green, nips into the village pub and meets the mayor

I don't know about you, but the word hacker has always conjured up rather strange images: strange folk who stay up till the wee hours, staring at a screen crammed with technical jargon like 'V32bis' and 'eight bits, one stop bit, no parity'; people who talk in low tones about multi-user dungeons and remote social interaction.

You'll be glad to know, then, that Vic Curshen is a totally normal human being, apart from the fact that he's mayor of a village which doesn't exist in the normal sense of the word, but only on the screens of his villagers.

Silicon Village is a 'national leisure and computing viewdata service', and takes the concept of viewdata (as used on teletext serives like Ceefax and Oracle) one step further. And just about anyone can take up residence in Siliconshire.

'I decided as a strategy that Silicon Village should actually be relevant to more than just anoraks', says Vic, confirming my suspicions that he's no computer bore. This bloke, one feels, would be good company for a virtual pint down Silicon Village's pub, The Dog and Bone.

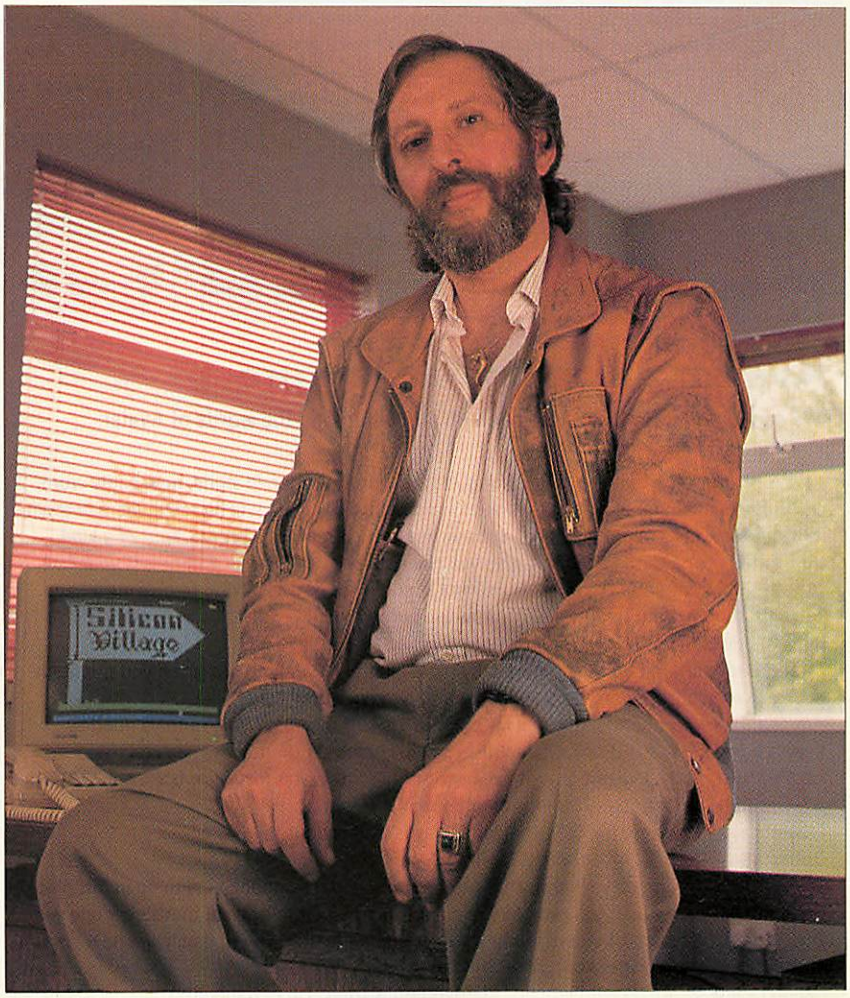
'For example, my girlfriend has been on-line for seven or eight years now, and she's now learnt how to edit the Avatar database (Silicon Village's multi-user adventure game) yet she knows nothing conceptually about comms or computers. She's not stupid, she just doesn't need to know about the details. There's this whole idea that you don't need to be computer literate or well-versed in the technicalities of comms to enjoy Silicon Village.'

WHY SILICON VILLAGE?

In the eighties comms really began to take off, but the closure of Micronet at the end of 1991 marked the end of an era. However, a number of Micronet editors (including the managing editor) went over to Silicon Village and took their ideas with them, so re-establishing the Micronet style. However, Silicon Village is conceptually very novel: the whole system is based entirely round the English village.

'What has been picked up is that the system is consistently a village,' says Vic. 'So we have the leisure centre, the high street and so on. A recent phone call from a new villager confirming his account included the phrase "It seems to be a real village, not just another bulletin board. It must be run by nutcases." Funny, I don't know what gave him that idea.'

Silicon Village should, in my opinion, be called Silicon Sprawling Metropolis. There are over 75,000 pages in the system, more than three



TONY LATHAM

Vic Curshen, of Silicon Village

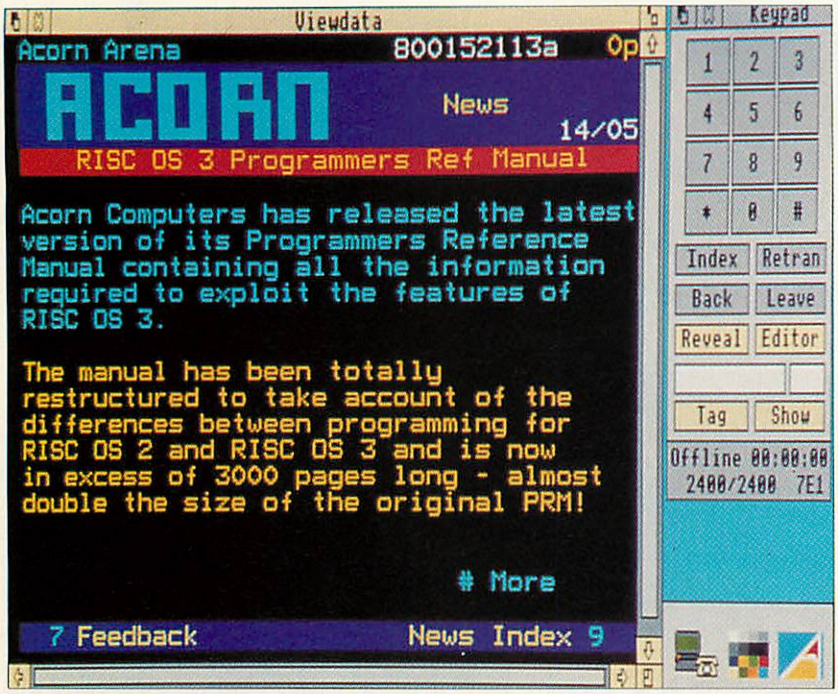
Silicon Village Acorn User reader offer

Silicon Village has put together a special package for *Acorn User* readers. Silicon Village will give five hours of free access to any readers who write to the following address, giving their name, address and telephone number: Silicon Village Acorn User Reader Offer, 5 Saturn House, Calleva Park, Aldermaston, Berkshire RG7 4QW. Alternatively, you can ring Helen (0734) 819351 or Sue (0992) 586919, who will also answer any queries you may have. Any readers who take up a six month subscription costing £46 ex VAT, will receive a free Silicon Vilage mug, and for twelve months' subscription, a free Silicon Village teeshirt.

To access the Silicon Village itself, set your comms software to Viewdata (7E1) and dial 081-759 2348 (12/75) or 081-759 6996 / (0734) 819000 (all speeds). You may log in free using account 4444444444 with password 4444: this will enable you to see the demo account, which has very restricted access to the village.

Silicon Village also does deals on complete modem packages with software and subscriptions; you should ring the first number given above for details.

On this month's magazine disc is the Silicon Village demo, which gives a taster of what you can expect from life in the village.



times the number in Micronet, and the number is expanding all the time.

The village consists of the Village Green (for general information); the High Street (which contains the newsagents, the post office, the village hall, the village church and much more); the Clubhouse (with clubs such as The Potting Shed for gardening enthusiasts, and Valkyrie for those interested in 'the woman's point of view'); the Art Gallery; the Leisure Centre; the Computing Centre (which includes the Acorn Arena) and the Village Hall.

It seems planning permission is not too hard to get hold of in the village, as buildings do shift around occasionally, but overall the atmosphere is very convincing, and you find yourself talking about fellow villagers and posting mail in the post office.

SO, WHAT ABOUT ACORN?

Silicon Village caters well for Acorn users compared to, say, Atari or Amiga users. According to Vic, the villagers said that they would like to see a strengthening of Acorn coverage in the village. As a result there is the Acorn Arena, the Acorn Support Area and Archimedes and BBC telesoftware areas.

In fact, two to three times as many Acorn users access the village as PC users, and the Acorn Support Area is the only one on national local dial. So, wherever you live, you can dial a local number to connect to the village.

The majority of the editors on Silicon Village use Arcs to create their pages, so, although the village actually lives on a 486 66MHz PC, with 4Gb of disc space and 32Mb of Ram, Acorn coverage is healthy.

The Acorn Arena contains letters, reviews, comments, hints, tips and features, while you can download public domain software for both the BBC and the Arc from the telesoftware section. Access to the Acorn Support Area is also through the Arena, and from here the latest news and software upgrades are available direct from Acorn.

Future plans for Acorn machines are also encouraging. A development which should see the light of day in the summer has the working title of *CliveNet* (guess the author's name), which is aimed particularly at schools. *CliveNet* is a multiplexing system, basically a way of linking a number of Archimedes or BBCs over an Econet or Ethernet. It allows multiple Silicon Village sessions on just one phone line, cutting the phone bill by a considerable amount.

However, it doesn't really matter whether you use an Acorn or a ZX Spectrum as a lot of the village is dedicated to non-computing discussion. As Vic says: 'Villagers talk about anything from London Underground to shortwave radio. We help people find each other by providing a hobby directory, and a region directory. So if they want to meet they can.'

The only reservation I had was with viewdata itself. Because it allows only a small amount of text per page, it can be slightly laborious reading all the letters and articles. However, that's a small gripe.

Vic sums up Silicon Village in just three words: 'We're a community'. And it's far safer than Waco, Texas.

Avatar: an on-line adventure

We sent adventurer Dave Lawrence on a quest to find the words of Avatar

Here is your quest, young Mr Benn. Bring me the words, written in stone, now badly worn, and almost unknown.' Ha! An easy one to start with; that tablet will be somewhere in town. 'What this contains might make you sneeze, but getting it is not a breeze. Four of a kind from battles gory, once joined will give you the entire story. To enter darkness is your fate, so read the words upon the gate.' Now, that's more tricky, I'll ask Orion to give me a hand.
Zarabeth the Dazzling Deity suddenly appears before you.
Hi Zara, how's things? Have you liquouriced anyone recently?
Zarabeth rolls around on the ground in helpless laughter. Zarabeth has given you the suede pouch. 'A wee gift for you. How are you doing on your quest, Jelly?'
Fine thanks, be careful though, Tealeaf's about. Tealeaf farshouts 'Ang onto ya goodies... there's a tealeaf abart!' Tealeaf telepaths to you 'I heard that!'
fsh 'Hey everybody, I've got to write some words about Avatar for *Acorn User*. Anyone got any (sensible) comments?– farshout them to me!'
Tealeaf says: 'peeps are friendly, the game play is tremendous.'
Optimist says 'best bit is the lovely Zarabeth.'
Tealeaf says: 'used to play shades. That got boring. Always somefink new to do in this place.'
Orion telepaths to you: 'I got nearly 340 hours clocked up on this game; that's over one year.'
Tealeaf says: 'it's just just when you fink you've sussed Avatar, you find anuvver new area, or they bung in more spells or puzzles and fings.'
Hannah snuggles up close to you and cuddles you warmly. Oh hi Hannah!
Tealeaf says: 'I gotta go into the citadel for me next quest... gulp.'
Hannah says: 'well I like the interaction, forming parties to do the more dangerous quests.'
Hannah, How long have you been playing?
Hannah says: 'since Day One, November 91. They've got a crowbar to get me out of my seat.'
Gloom says: 'once you have played Avatar for five minutes you're hooked for life.'
Oomigooly telepaths to you: 'I'm 52 years old and hooked on it, you may quote. Best bits? Social life, helping friends. I cope more easily with this system than arcade type games.'
Zarabeth says: 'you need a few sessions on here to get to know your way around. There are more than 4000 locations and even more when the new magic area opens up. More monsters (mobiles), more puzzles, combat methods.'
Orion says: 'once the mobile system is totally finished things will get even more fun!'
Verge telepaths to you: 'the game for all ages, mentalities or sexes.'
Zarabeth says: 'omit the bits about liquorice and inflatable sheep then!'
Orion says: 'some of the weds fun nights are fun in terms of role-playing.'
Zarabeth says: 'we had a Mr Avatar contest one night, it was a scream.'
Zarabeth says: 'well that's the brilliance of text, you use your imagination.'
Zarabeth says: 'okay, bye for now Mr Benn, hope you enjoyed it!'
Orion gives you an affectionate hug!. Orion says: 'seeya!' You hug Zarabeth.
*>qq Your Deity details have been saved.

1

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Archimedes micro

System	Basic	Colour	Multiscan
A3010-1Mb Family	£424	£625	£769
A3010-2Mb L/C	–	£680	–
A3020-2Mb FD	–	£749	£799
A3020-2Mb HD60	–	£899	£949
A4000-2Mb HD80	–	£949	£999
A4000-Home Office	–	£999	£1049
A5000-2Mb HD80	–	£–	£1399
A5000-L/C 2Mb HD80	–	–	£1445
A5000-4Mb HD120	–	–	£1599
A5000-2Mb ES	–	–	£1299
A5000-2Mb NS	–	–	£1399
Pocket Book	£212	–	–
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On-Site Maintenance now available on all Archimedes Micros. Please telephone for details.

Archi A4 Notebooks

A4 Notebook with 2Mb RAM	£1399
A4 Notebook 4M RAM/60M HD	£1699

FREE OFFER
When you purchase any of the above Archimedes Micros, we will give 10% of the value of the machine in Hardware or Software of your choice

Acorn JP150 Ink Jet Printer £199

Archi Accessories

- 5.25" 800K external Floppy Drive £80
- Acorn I/O Podule (Analogue/User/1MHz bus) £79
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- MEMC 1A Upgrade £29
- MIDI add-on to Acorn I/O Podule £27
- MIDI Expansion Card £65
- Archi replacement mouse – New design £29
- PC Emulator £95
- Floating Point Unit £455
- Keyboard Extension Lead £6
- 2 Podule Backplane £20
- 4 Podule Backplane £25
- Fan for above backplanes £10
- Risc Os Extras Software Disc £5
- SCSI Card 8 bit £129
- SCSI Card 16 bit £149
- SID Utilities Discs – Set of 4 £19
- ST506 Hard Disc Controller Card £99
- A5000 Dust Cover £9
- A5000 Technical Reference Manual £65
- A4 Spare Batteries £49
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- Scanlight Junior £199
- Scanlight II A4 £279
- Scanlight II Sheet Feeder £139
- Scanlight Professional £529
- CC Faxpack £289
- Colour Card £239

RISC OS 3 Upgrades

- A 5000 Software Upgrade Kit £16
- Software Upgrade Kit for the rest £40
- Hardware Upgrade Kit 300/440 £25



Watford Electronics Headquarters – Luton

Scan256 Grey Scale Scanning

If you need a 256 grey-scale hand scanner for your Archimedes then look no further.
Scan256 gives you up to 256 levels of grey at a maximum of 400dpi and is supported by state-of-the-art sophisticated software – **for only £159.** This makes it the only sensible scanning and image processing solution for the Acorn 32-bit range. Just compare these features:

- More than one copy of the image held in memory at once.
- Allows multiple consecutive operations without saving the original to disk.
- Highly advanced dithering and image size reduction.
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- Plus much much more...

Please specify Archimedes type, not compatible with A3010, A3020, A4000. **£159**

- Scan256 for A3000 Micro £169

A3010 DTP Pack

Supplied with 3.5" Floppy Disc Drive and a mouse, Colour Monitor and lead, TV modulator, 30Mb fast IDE Hard Disk Drive, 'Compression' utility to increase the Hard Drive capacity to typically 60Mb, the highly acclaimed Computer Concept's Impression Junior DTP package, EasiWord wordprocessor, Quest for Gold game, applications suite of software packages and comprehensive audio training tape.

RRP: £1095

Sale Offer Price: £775

- A3010 DTP Pack with Learning Curve £875
- Additional 1Mb RAM fitted £39

Special Education discounts available on micros, RAM upgrades, ARM 3 Turbo Card, etc. Please write in or telephone:
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Now everyone can afford an Archimedes Micro with Watford Electronic's up to 60 months instant credit facility.

(Please telephone 0582 45 44 55 for details)

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All our memory upgrades are simple to fit. No soldering required. Fitting instructions supplied.

- **R300**-4 Layer RAM upgrade board (Bare). £25
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- **R304**-A3000 – to 4MB RAM Upgrade £99
- **R305**-A3010 – to 2MB RAM Upgrade £39
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Acorn's Archi DTP Package	£69
• Equasor £39; • Expression-PS	£19
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Ovation DTP	£85
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- Multimedia Expansion £499
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Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine.

A powerful security feature has been provided with the two unique commands *IDELock and *IDEUnlock, ideal for educational establishments where hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The !IDEForm Write Protect option is particularly useful in conjunction with *IDELock as it will prevent any unauthorised deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

A300/A400 Internal IDE Drive

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	£189
ADA 0550	80Mb	17mS	£239
ADA 0530	100Mb	16mS	£259
ADA 0570	200Mb	15mS	£369
ADA 0880	330Mb	15mS	£599

All above 3.5" Drives are supplied complete with Controller Card & cable for use with A300/A400/A500 series machines.

AAA 0300	External Case & PSU for A3000	£85
AEA 1060	Archi IDE Hard Disc Podule only	£89

A5000 Internal IDE Drive

ADA 1030	80Mb	17mS	£189
ADA 0940	100Mb	16mS	£195
ADA 0950	200Mb	15mS	£275
ADA 0580	330Mb	15mS	£525

A5000 2nd Internal IDE Hard Drive

ADA 1040	80Mb	17mS	£195
ADA 0960	100Mb	16mS	£205
ADA 0970	200Mb	15mS	£285
ADA 1010	330Mb	15mS	£535

A3000 External IDE Drives

ADA 0780	44Mb	28mS	£254
ADA 1020	80Mb	17mS	£305
ADA 1050	100Mb	15mS	£324

Internal Hard Disc Drives for A3000/A3010

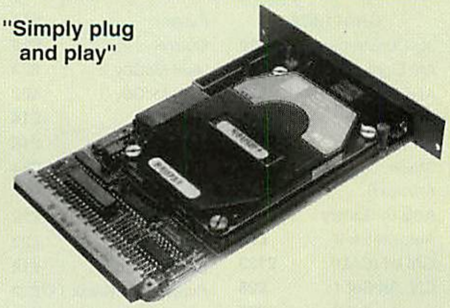
State of the art, 4 layer internal IDE Hard Cards for the A3000. Software supplied in, On-board ROM.

ADA 0150	20Mb	19mS	£149
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ADA 0730	120Mb	16mS	£395

Supplied ready assembled. No soldering required. Simply plug into the allotted space.

Archi IDE Hard Cards

"Simply plug and play"



Watford's easy to instal, low cost, high performance, revolutionary IDE Hard Cards for the A300 & A400 series Archimedes.

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ADA 0890	60Mb	18mS	£299
ADA 0670	80Mb	18mS	£309
ADA 0680	120Mb		£405

(All above Hard Cards can be used as Removable Hard Drives. Ideal for Military and Education use.)

Archi to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.

- Risc OS 2 Version £15
- Risc OS 3 Version £16

(P.S. For A3000 Serial Upgrade **(£19)** required)

A3000 Accessories

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- Technical Manual £39
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- A3000 User/Analogue/IIC I/O Card £38
- A3000 External Podule Case £15

A3000 I/O Card (User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

Features

- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices. **£38**

Cortian CKAI Interface

Eliminates need to have a User port in A3000/305/310/400/540 when using Concept Keyboard. £28

Concept Keyboards

- A4 Standard Pack £89 Primary Pack £95
- A3 Standard Pack £94 Primary Pack £99
- A4 Designer Pack £104 A3 £104
- Universal 2010 Keyboard A3 £107
- Universal 2010 Keyboard A4 £104

Leasing finance at very attractive rates now available to Businesses (subject to status), Schools, Colleges, Universities, Government Depts. and Local Councils. Minimum order £1,000. Please telephone for details.

Archimedes External Disc Drive Interface

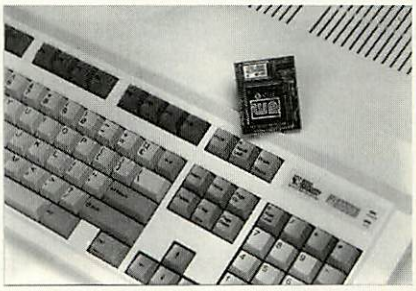
With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead. **Price £21**

Back Plate Extension

- A300/400 £15;
- A3000 £14

ARM 3 Turbo Card MkII

Simply The Best



Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £145. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £24.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

RRP £249

Special Offer £135

Network Accessories/Software

BBC B Econet Kit	£42
Master Econet Module	£40
Archimedes Econet Module	£40
A3020/4000 Econet Module	£49
Acorn A4 Econet Module	£50
Archimedes Ethernet Card	£139
A3020/4000 Ethernet Card	£179
AUN/Level 4 Fileserver	£379
Econet Starter Kit	£137

(P.S. Full range of Network Accessories/Software/ Site Licences available. Telephone for details.)

Schools and Colleges

Trade in any computer for £60 or £110 when purchasing selected Archimedes micros. Call for details.

Continued→ → → → → → → → → →

BBC Education Software

A vous la France	French programs for beginners	£29
Au restaurant/Accident de route	French games for 12 years +	£26
Bolougne and oh les	French program for beginners	£26
Computer control	Program simulating computer control	£26
Computers at work	Primary education program	£17
Espana Viva	Spanish educational programs	£20
Folks Tales	Listening and reading for ages 7+	£22
Geordie Racer	Look and read for ages 7+	£22
Hall of Mirrors	Practice word & number skills	£22
Help your child learn basic mapwork 2		£18
Inside Science	Four common science subjects	£22
Letters and pictures	Educational programs for 6-8 years	£15
Make a wildlife garden	Explore wildlife/weather/garden growth	£22
Maths with a story 1	Primary level maths programs	£20
Maths with a story 2	4 further maths programs	£20
Note invaders	Learn sheet music for 7-Adults	£15
Numbers & Pictures	Early number learning (4-6 years)	£15
Picture craft	Geometrical design & Colouring	£17
Puncman 1 & 2	Learning Punctuation (7-13 years)	£15
Puncman 3 & 4	Learning Punctuation (8-14 years)	£15
Puncman 5, 6 & 7	Learning Punctuation (8-15 years)	£15
Ramayana Tales	Simple Desktop Publisher using pictures & characters from the Ramayana	£22
Skyhunter	Look and read educational adventure	£22
Technology and design	Problem solving programs	£22
Through the dragons eye	Adventure game and Map reading	£22
Fun School 3 (Under 5)	Varied range of Education subjects	£17
Fun School 3 (5-7)	Varied range of Education subjects	£17
Fun School 3 (Over 7)	Varied range of Education subjects	£17

Archi Educational Software

10 out of 10 Early essentials	£20
10 out of 10 English	£20
10 out of 10 Maths	£20
Animated Alphabet (3-6 yrs)	£21
Arcventure (8-12 yrs)	£29
Bookbinder	£43
Bumper Disc	£14
Bumper Disc 2	£14
Craftshop 1	£19
Craftshop 2	£19
Converta-Key	£16
Data Word	£16
Desktop Stories	£35
DigiSim	£35
Dream Time (5-7 yrs)	£23
Farm (5-7 yrs)	£19
Fleet Street Phantom (9-13 yrs)	£25
Fun School 3 Red (up to 6 years)	£17
Fun School 3 Green (6-8 years)	£17
Fun School 3 Blue (8 years +)	£17
Gate Array Teaching System	£68
Glimpse Clip Art Utility (7-16 yrs)	£8
Highlighter (6-16 yrs)	£42
Jigsaw	£19
Linkword French	£32
Linkword German	£32
Linkword Spanish	£32
Mapventure (9-13 yrs)	£24
Microbugs	£24
Money Matters	£16
Nature Park Adventure (7-9 yrs)	£27
Numerator	£60
Picture Book	£16
Recall (6-13 yrs)	£39
Sellardore Tales	£24
Snippet	£36
Space Mission Mada (9-13 yrs)	–
Sting of the Dump (9-13 yrs)	£22
Victorians	£29
Viewpoints (9-12 yrs)	£33
Wizard's Revenge (7-10 yrs)	£17
World Map Study	£59
Worst Witch (7-10 yrs)	£25

Archimedes Software

GRAPHICS

3D Construction Kit	£39
Arc Light	£46
ARCtist	£19
ARCticulate	£19
Art Works	£129
Atelier	£60
Artisan II	£45
Artisan Gallery	£16
Autosketch II	£65
CADet (CAD)	£129
Clip Art Set 1	£28
Clip Art Set 2	£28
Concept Designer	£23
Craftshop 1 & 2	£28
Euclid 2	£50
Graph Box	£59
Graphbox Professional	£107
HotLink Presenter	£40
Illusionist	£69
Kermit	£46
Mogul	£17
PCAD Educ.	£395
Pro Artisan	£70
ProCAD	£439
Prime Art	£59
Render Bender 2	£79
Revelation 2	£80
Titler	£119
Tween	£29

GAMES

Air Supremacy	£17
Apocalypse	£14
Arcade 3 Compilation	£12
Battletank	£10
Black Angel	£27
Boogie Buggy	£14
Break 147 + Supa Pool	£19
Bughunter in Space	£12
Cataclysm	£19
Caverns	£10
Champions	£25
Chess 3D	£16
Chocks Away	£27
Compendium	£32
Chocks Away Extra	£14
Chuck Rock	£18
Conqueror	£15
Cyber Chess	£38
Cycloids	£20
Ego Repton 4	£–
Elite	£33
Enter the Realm	£19
E-Type Compendium	£20
E-Type Designer	£13
Fervour	£35
Galactic Dan	£19
Gods	£24
Grievous Bodily Arm	£19
Hero Quest	£25
Holed Out Designer	£13
Holed Out Golf Comp	£20
Inter Dictor 2	£26
Iron Lord	£15
Jahangir Khan Squash	£19
Lemmings	£20
Oh no more Lemmings	£15
Lost Temple	POA
Lotus Turbo Challenge	£19
Mad Prof Mariarti	£17
Masterbreak	£16
Man at Arms	£14
MahJong Patience	£15
Manchester United II	£19
Nebullus	£21
Nevryon II	£20
Omar Sharif's Bridge	£23
Pandoras Box	£18
Pipe Mania	£17
Play It Again Sam	£–
Populous	£23
Pysanki	£14
Quazer	£10
Real McCoy 2	£23
Real McCoy 3	£22
Redshift	£14
Return to Doom	£16
Repton 3	£14
Saloon Cars Deluxe	£27
Sim City	£22
Spitfire Fury	£22
Superior Golf	£14
Superpool + Break 147	£22
Swiv	£19
Talisman	£12
Techodream	£20
Trivial Pursuit	£22
Twin World	£15
U.I.M.	£23
White Magic 2	£15
Worldscape	£16
XFire	£19
Zelanites	£23

Miscellaneous

Ancestry	£59
Arccomm 2	£38
Arcterm 7	£64
Armadeus Sound	£60
Avante Garde Fonts	£23
Battle Chess	£25
BBC DFS Reader	£6
Broadcaster Loader	£65
Chameleon	£34
Chart Well	£25
Chatter	£34
Compression (CC)	£38
Craftshop 1	£27
Craftshop 2	£27
Desk Edit 2	£29
Equasor	£38
FlexiFile	£97
Genesis	£10
Genesis Plus	£68
Genesis 2	£99
Investigator 2	£22
Magpie 2	£42
Notate	£42
Numerator	£66
Pin Point	£65
Polyglot	£16
Presenter 2	£29
Presenter Story	£145
Prophet Accounts	£132
Prophet Demo Disc	£10
Rainforest	£17
Revelation 2	£95
Rhapsody in Blue 2	£45
Score Draw	£46
Show Page	£127
Speech!	£15
The Victorian	£17
Time Tabler	£499
Toolkit (Clares)	£35
Touchtype	£40
Tracker	£39
Turbo Driver BJ10E	£42
Type Studio	£43
Vox Box	£46
Wimp Programmer's Toolkit	£16
WorldScape	£17

LANGUAGES

Desktop C	£199
Macro Assembler	£40
Robo Logo	£69
BASIC Compiler	£77
Logotron Logo	£45
Risc BASIC	£120
Risc FORTH	£110
Cambridge Pascal	£95

BBC/Master Games

Acornsoft Hits 1	£10	Sim City	£10
Acornsoft Hits 2	£10	Superior Collection 1	£10
Air Supremacy	£10	Superior Collection 2	£10
Play It Again Sam 1	£10	Play It Again Sam 9	£10
Play It Again Sam 2	£10	Play It Again Sam 10	£10
Play It Again Sam 3	£10	Play It Again Sam 11	£10
Play It Again Sam 4	£10	Play It Again Sam 12	£10
Play It Again Sam 5	£10	Play It Again Sam 13	£10
Play It Again Sam 6	£10	Play It Again Sam 14	£10
Play It Again Sam 7	£10	Play It Again Sam 15	£10
Play It Again Sam 8	£10	Play It Again Sam 16	£10

Archimedes Fonts

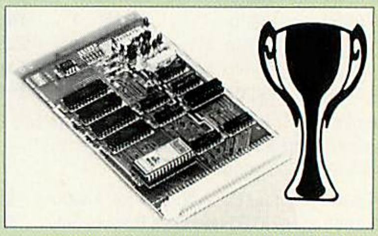
	Risc OS 2	Risc OS 3
Allegro	£12	£17
Asia	£7	£10
Basia	£9	£12
Briony	£10	£15
Caxton	£24	£35
European 3	£28	£40
Griffo 2	£27	£40
Olivia	£24	£35
Peters	£24	£35
Simple	£24	£35
Swiss Inserat	£5	£7
Yates	£10	£15

TEX EPROM ERASERS

Over erasure of EPROMs very rapidly turns them into ROMs!
The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

- **ERASER GT** – Deluxe version erases up to 8 chips. Has automatic safety cut-off to switch off the UV lamp when opened. £36
- Spare UV tubes. £12

Archi Real-Time Digitiser



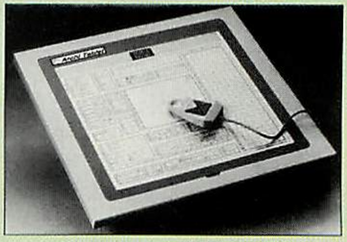
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £75

A Set of Colour Filters for colour image grabbing using a video camera £16

Archi Graphic Tablet

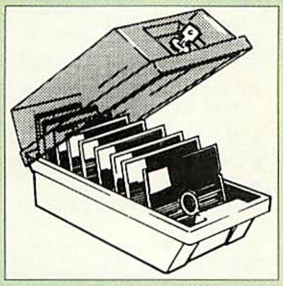


Special Price £199

(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£20**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus £105

Antistatic Lockable Disc Storage Units



- **M35** – holds up to 50 5.25" discs £4.95
- **M85** – holds up to 95 5.25" discs £6.95
- **M25*** – holds up to 25 3.5" discs £4.95
- **M50** – holds 50 3.5" discs £6.50
- **M100** – holds 100 3.5" discs £6.99
- **M10** – holds 8 of No. 10 Data Cartridges £15

* Not lockable

Disc Plonker Rack



When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs. **£2**

3M – Diskettes

Lifetime warranty on 3M Discs

- *10 x 5.25" S/S D/D 40T (744)* *£5*
- *10 x 5.25" D/S D/D 40T (745)* *£5*
- *10 x 5.25" S/S D/D 80 Track (746)* *£6*
- *10 x 5.25" D/S D/D 80 Track (747)* *£7*
- *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT* *£8*
- *10 x 3.5" S/S D/D 40/80 Track* *£6*
- *10 x 3.5" D/S D/D 40/80 Track* *£6*
- *10 x 3.5" Double Sided High Density* *£10*

Top Quality Diskettes

Watford's life time guaranteed disc are supplied complete with self stick labels & plastic library case.

- *10 x **M3** 3.5" D/S D/D 80 Track* *£6*
- *10 x **M9** 3.5" D/S High Density* *£10*
- *10 x **M4** 5.25" S/S D/D 40 Track* *£5*
- *10 x **M5** 5.25" D/S D/D 40 Track* *£5*
- *10 x **M7** 5.25" D/S D/D 80 Track* *£6*
- *10 x **M8** 5.25" D/S H/D Hi-Density* *£9*

Special Bulk Offer Discs

(Lifetime warranty on Discs)

BULK PACK DISCS in lots of 100

Type	S/S 40T	D/S 40T	D/S 80T
• Without Sleeves 5.25"	£25	£30	£35
• With Sleeves 5.25"	£28	£33	£38
• 3.5" D/S D/D	£21 for 50	£39 for 100	
• 3.5" D/S H/D	£40 for 50	£75 for 100	

Disc Drive Power Leads

Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00**; Dual **£3.75**

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

3.5" Disc Drive

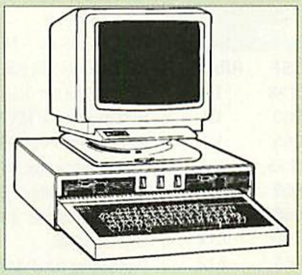


These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• **CLS35:**	Single Disc Drive, 400K	£59
• **CLD35:**	Twin Disc Drives, 800K	£109
	Disc Drive with PSU	
• **CS35:**	Single Disc Drive, 400K	£82
• **CD35:**	Twin Disc Drives, 800K	£126

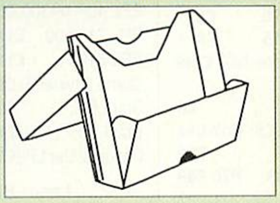
(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drives in Monitor Stand



- **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use. **£150**
- **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5". **£145**

Plastic Library Cases



- **DLC1** – Holds 5 x 3.5" Discs. £1.50
- **DLC2** – Holds 10 x 3.5" Discs. £1.90
- **DLC3** – Holds 5 x 5.25" Discs. £1.60
- **DLC4** – Holds 10 x 5.25" Discs. £2.00

Disc Albums

Attractively finished in leather-look PVC Vinyl

- **DW1** – Holds 6 x 3.5" Discs £2.50
- **DW2** – Holds 6 x 5.25" Discs £3.00
- **DW3** – Holds 20 x 5.25" Discs £3.50
- **DW4** – Holds 40 x 3.5" Discs or 5.25" Discs £4.50

Cleaning Kits

- 5.25" Disc Cleaning Kit £4
- 3.5" Disc Cleaning Kit £4
- PC Cleaning Kit £7
- Professional PC Cleaning Kit £12
- Aerosol Dust Spray Can £3
- Servisol Foam Cleaner Can £3
- Antistatic Aerosol Spray £3

Acorn & Watford DFSs

- Watford sophisticated DFS ROM £16.00
- Watford DFS Kit complete £49.00
- DFS Manual (comprehensive) £6.95
- Acorn DNFS ROM £17.00
- Acorn ADFS ROM only £25.00
- Acorn 1772 DFS ROM Kit £49.00
- Acorn DFS Kit complete £48

Watford's MkII 1772

Single/Double Density DFS

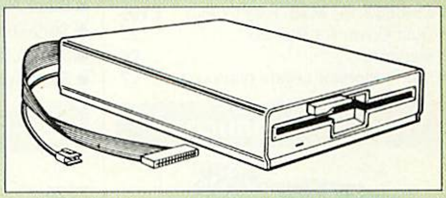
Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1772 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1772 DFS, plus many more added features.

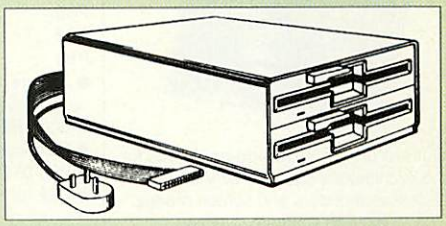
- Complete Kit Special Price **£44**
- DDFS Manual (No VAT) £6.95

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted. Follow the trend with a Watford plinth. *(Turn to the 6th page of our advert for the Plinths).*
P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"





Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• **CLS400S:**	Single, 40/80 track 400K Double sided Drive	**£70**
• **CLD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£138**
	Disc Drive with PSU	
• **CS400S:**	Single, 40/80 track, 400K Double sided Drive	**£80**
• **CD800S:**	Twin, 40/80 track, 800K Double sided Drives	**£149**

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Continued→ → → → → → → → → →

Microvitec Monitors

- **1431** – Standard Resolution #£175
- **1451** – Medium Resolution #£215
- **Cub3000** Medium Res for A3000 #£195
- Dust Cover for Microvitecs **£5.50**
- **Touchtec 501 Touch Screen £239**
- **Touchtec 3000** £–

3 years parts & labour warranty

Multiscan Monitors

Eizo T240i	£589	Panasonic C1381	£199
Eizo F340i-W	£625	C1381LR	£270
Eizo F550i	£899	Taxan 787	£215
Eizo T560iT	£1345	Taxan 787LR	£239
Eizo T660i-T20"	£1899	Taxan 789LR	£289
Eizo 9060	£499	Taxan 795-PC	£465
NEC 2A-N	£274	Taxan 875+ LR	£739
NEC 3FG	£360	Txn1075-20"	£1189
NEC 4FGe	£517	Taxn1150	£1699
NEC 5FG	£877	Taxn2013LR	£1045
NEC 6FG	£1739		

Panasonic monitors carry 2 years on-site maintenance warranty

Aries AlphaScan Monitor

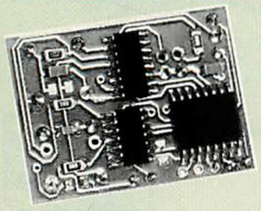
Its multiscan circuitry provides automatic adjustment for frequencies between 31 and 56KHz horizontal, and 43 and 70Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The VIDC Adaptor supplied with the monitor allows high resolution operation in all screen modes. **£299**

- Aries Alphascan 17" Plus **£585**

Philips Monitors

- **BM7502** 12" Hi-res Green **£88**
- **CM8833** 14" Med. Res Colour **£195**
- Dust Cover for Philips Monitors **£6**
- Spare Monitor Leads (various) **£7**

VIDC Enhancer



Our two unique VIDC add-on boards for the Archimedes cater for all VGA and Multiscan monitors and screen modes. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A Desk Top application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: Its unique design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control **£35**

MultiVideo VIDC Card: As above but for MultiScan monitors only. **£19**

Plotters

- DXY1100 **£550** • DXY1200 **£715**
- DXY1300 **£935** • Sketchmate A4 **£319**
- Sketchmate A3 **£455**
- Roland Plotter Fibre Tip Pens **£7.50**
- HP7440AU **£665** • HP7475AU **£899**
- HP7570A **£199** • HP7575AU **£2529**

Printer Leads

- BBC Centronics 4' **£5**; 6' **£6**
- Archi Parallel 2m **£5**; 5m **£9**; 10m **£13**
- PC Parallel 2m **£5**; 5m **£9**; 10m **£13**
- 25 pin D Male/Male 2m **£5**; 5m **£10**
- Centronics Double Ended 4' **£5**; 6' **£6**; 5 meter **£10**; 10 meter **£14**
- RS232 Leads Various **£POA**

Integrex Ink Jet Printers

- Colour Jet 132 Printer **£425**
- Paper Roll **£6.50**
- BBC Screen Dump Software **£10**
- Colour Cartridge **£21**
- Black Cartridge **£12.40**
- 100 A4 OHP transparencies **£55**
- 8K Serial Interface Optional **£123**
- Colour Jet 2000 **£599**
- Betajet Ink Jet Printer **£185**
- Betajet Cut Sheet Feeder **£43**
- Integrex Colourjet Series 2 **£335**
- Auto Sheet Feeder for Series 2 **£45**

Star Printers

	Printer	CSF	Ribbon
LC15	£190	£135	£5
LC20	£102	£60	£4
LC100C	£126	£65	£9
LC24-15	£245	£135	£5
LC24-100	£143	£69	£5
LC24-20 Mk2	£175	£65	£5
LC24-200C	£214	£65	£12
LC200 C	£151	£65	£12
Star Jet	£169	£43	£16
XB24-200C	£324#	£80	£12
XB24-250C	£389#	£139	£12
ZA-200C	£260#	£89	£12
ZA-250C	£324#	£139	£12

Includes 12 months on-site warranty

- Black Ribbons for Colour Printers **£5**
- Serial 8K I'face LC10/15/24/200 **£52**
- 32K Buffer LC/XB24-10; 15; 200 **£52**
- Star/Archi Colour Printer Driver **£15**

NEC Pinwriter Printers

	Printer	CSF	Ribbon
P220	£181	£59	£6
P32	£235	£59	£6
P62	£320	£89	£8
P72	£395	£115	£8
P90	£577	£115	£8

- Jetmate J400 **£169**; • Jetmate J800 **£249**

- Black Ribbons P20; P32 **£6**
- Ribbons P60/70/P90 Black **£8**; Colr **£14**
- P60/70 Colour Option Kit **£59**
- CSF for P20 **£59**; P60 **£89**; P70 **£89**

Panasonic Printers

	Printer	CSF	Ribbon
KX-P1123	£126	£59	£6
KX-P1170	£98	£59	£6
KX-P1624	£264	£126	£8
KX-P1654	£330#	£126	£8
KX-P1695	£267	£126	£8
KX-P2123M	£144	£79	£8
KX-P2123C	£194	£79	£15
KX-P2124	£215	£89	£8
KX-P2180M	£126	£79	£8
KX-P2180C	£143	£79	£15
KX-P2624	£269#	£126	£8

Includes 12 months on-site warranty

- Dustcover for 80 column printers **£6**
- Serial Interface for above Printers **£46**
- Black Ribbons for P1081, 1180, 1124 **£6**
- Brown, Blue or Red Ribbons for KX-P1081/1592/1595/1695 **£9 each**
- 32K Buffer for above Printers **£16**

P.S. We only sell original Panasonic Ribbons which are guaranteed to last 3 million characters

Laser Printers

All Laser printers (excluding HP Lasers) include 12 Months On-Site maintenance

Brother HL4-VE	4ppm	£594
Brother HL4-PS Postscript	4ppm	£974
Brother HL-10V	10ppm	£1045
Brother HL10-PS	10ppm	£1329
Brother HL10-DV	10ppm	£1149
Brother HL10-DPS	10ppm	£1445
Canon LBP4 LITE	4ppm	£525
Canon LBP4+ 1.5M RAM	4ppm	£644
Canon LBP-8111 Plus	8ppm	£945
Canon LBP-8 Plus IIIR	8ppm	£1435
Canon LBP-8 IV 600DPI	8ppm	£989
Epson EPL-4000	6ppm	£445
Epson EPL-5200 – NEW –	6ppm	£565
Epson EPL-7500 PS	6ppm	£1139
Epson EPL8100	10ppm	£920
Fujitsu VM600	5ppm	£579
Fujitsu VM800 (Best Buy)	8ppm	£535
HP Laserjet IIISI	16ppm	£POA
HP Laserjet IIISI PS	16ppm	£2469
HP Laserjet IIIP	4ppm	£625
HP Laserjet 4	8ppm	£1073
HP Laserjet 4L – NEW –	4ppm	£499
HP Laserjet 4M PS	8ppm	£1449
HP Laserjet 4si		£2260
HP Laserjet 4Si MX 1200 DPI	16ppm	£3385
NEC Silentwriter S62P PS	6ppm	£995
NEC Silentwriter S102	6ppm	£1075
NEC Silentwriter2 290		£1194
NEC Silentwriter 290P PS	8ppm	£1469
OKI OL400E	4ppm	£449
Panasonic KX-P4410	5ppm*	£459
Panasonic KX-P4430	5ppm*	£594
Panasonic KX-P4451	11ppm*	£919
Panasonic KX-P4455	11ppm*	£1294
Star LP-4 Post Script	4ppm	£774
Star LS-5	5ppm	£489
Star LS-5 EX (RISC Based)	5ppm	£599
Star LS-5 TT True Type+Mac	5ppm	£775
Star LP-8 III	8ppm	£899
Star LP-8 Star (post)script	8ppm	£1130

*2 years on-site warranty

HP Laserjet IIIP 3 years on-site	£150
HP Laserjet IIISi 3 years on-site	£450
HP Laserjet 4/4M 3 years on-site	£170

Laser Toners

Canon 2, 3 & 4	£52	KX-P4420/50/55	£20
Epson GQ	£12	KX-P4410/30	£29
EPL 40/41/4300	£55	NEC SWriter	£84
EPL 71/7500	£117	HPII/D, III/D	£60
EPL 8100	£117	HP IIP, IIIP	£54
Qume Crystal(3)	£84	HP4/4M	£72
Star LP4	£52	OKI OL400/800	£18
Star LS5	£69	VM800 8K pages	£99
Canon 8/Star LP8	£59		

Laser RAM Upgrades

Type	1M	2M	4M	
IIP; IIIP	£49	£80	£132	
II & IID	£60	£96	£142	
LJ4/4M	£–	£75	£175	8M/£279
EPL4100	–	£120	–	512K/£52
KX4420/50i	£59	£89	£149	
NEC S62/S102	£99	£180	–	
Star LBP	£139	£275	–	

Jetpage Postscript Cartridge

- HP IIP/IIIP **£225** • IID & III **£227**

Various Add-Ons

- Laserjet Appletalk Interface **£135**
- HP Adobe Postscript+ Cartridge **£359**
- Pacific Page Postscript **£259**
- HP Premier Font Collection **£28**
- Laserjet Various Font C'tridges **from £45**
- HP Postscript Module for LJ4 **£270**
- Laserjet 4 Powered envelope feeder **£199**
- Jetdirect Ethernet Card for Laserjet IIIsi/4/4Si **£359**
- 500 Sheet paper cassette (3rd Bin) **£205**
- HPIIP/IIIP Lower Cassette Tray **£96**
- Canon LBP-4 Lower Cassette Tray **£96**

Citizen Printers

120D+	£98	Swift 90C	£198
Swift 9	£145	Swift 200	£178
Swift 9X	£185		
PN-48	£189	Swift 240	£200
Swift 90	£139	Swift 240C	£212

2 years parts and labour warranty on all above Citizen Printers.

- Swift 24 Ribbons: Black **£4** Colour **£13**
- Cut Sheet Feeder for 80 col. printers **£75**
- Citizen 120D Ribbons **£3.50**
- Archi Colour Printer Driver **£15**

Hewlett-Packard Printers

Desk Jet 500	£249	DJ500 colour	£355
DJ 550 Colour	£459	Desk Jet 510	£253
DJ Portable	£269	Desk Jet 1200C	£1060
Deskwriter 500C	£349	Deskwriter 550C	£459
Paint Jet	+£495	PaintJet XL300+	£1549
Quiet Jet plus	£399	PaintJet XL300PS	£2620

+ Includes 12 months on-site warranty

3 years on-site maintenance available as follows:

DeskJet & DeskWriter mono	£55
DeskJet & DeskWriter colour	£65

- Paintjet Cartridge Black **£15**; Colour **£23**
- DJ Portable CSF **£49**; Carrying Case **£49**

Special Offer

When you purchase any Hewlett Packard printer from us, you qualify for the following software offers:

- Adobe Type Manager v2 **£45**
- Designworks Software pack at **£39**
- Lotus Organiser Software at **£39**

Desk Jet 500 Accessories

- Ink Cartridges Black **£16**; Colour **£23**
- High Capacity Ink Cartridges Black **£21**
- Ink Refill Double Pack (JetFill) **£10**
- Ink Refill High Capacity (JetFill) **£16**
- Archi – DJ550 Colour Printer Drive **£15**
- Epson FX Emulation Cart.(500 mono) **£45**
- IBM Proprinter Emulation Cartridge **£59**
- Wordperfect Cartridge **£89**
- DJ 500 Dust Covers **£6**
- 636G 50 x Transparencies A4 **£40**
- 636J 50 x Glossy Paper A4 (also XL) **£40**
- 630Z 50 x Cut Sheet Paper A4 **£15**

Plug In Font Cartridges for DJ 500

22706B - Prestige, Elite, Line Draw	£55
22706C - Letter Gothic & HP Line Draw	£56
22707P - Proprint Emulation Cartridges	£57

HP Paintjet/XL Accessories

- 630P 200 Z-Fold paper 8.5 x 11 **£14**
- 630Q 50 Transparencies 8.5 x 11 **£39**
- 630S 50 Transparencies A4 **£40**
- 630Y 200 Cut Sheets 8.5 x 11 **£14**
- 631Y 200 Cut Sheets A4 **£18**

Fujitsu Printers

- B-100 InkJet – HP Deskjet compatible 300dpi, whisper-quiet & 6 resident fonts **#£159**
- B-200 InkJet – HP Desk Jet compatible 300dpi. Built in Cut Sheet Feeder. Optional 2nd Bin/Tractor available **#£239**
- DL-1150 Dot Matrix – 24 pin, 110 column Colour optional **£209**
- DL-1150colour Dot Matrix – 24 pin, 110 column With colour option **£235**
- DL1250 **£344**; • DL4600 **£799**
- DL3600 **£439**; • DL5800 **£999**
- Joywriter **£249**; • DL1250 colr **£344**
- B-100 Cut Sheet Feeder **£65**
- B-200 2nd Bin Sheet Feeder **£95**
- B-200 Tractor Unit **£65**
- B-100/200 Ink Cartridges **£14**
- DL-1100 Colour Upgrade **£39**
- DL-1100 Ribbons Black **£5** Colour **£11**

Epson Printers

	Printer	CSF	Ribbon
EX1000C	£428	£–	£6
FX870	£273	£47	£4
FX1170	£339	£69	£6
LQ100	£148	£–	£4
LQ570+	£205	£47	£4
LQ870	£359	£47	£6
LQ1060	£585	£155	£6
LQ1070	£310	£69	£6
LQ1170	£434	£69	£6
LQ2550	£673	£360	£6
LX100	£116	£–	£4
LX400	£94	£69	£4
LX850+	£135	£69	£4
LX1050	£203	£125	£6
SQ870	£409	£59	£23
SQ1170	£560	£155	£23
SQ2550	£669	£–	£23
Stylus 800	£244	£–	£10

Epson RS232 Interface

Standard £28; +8K Buffer £75

- LQ100 Tractor Feed £29
- FX850/LQ800/850 Tractor Feed £69
- FX/LQ1050 Tractor Feed £85
- LQ2500/2550 Tractor Feed £90
- Dustcovers for 80 col printers £6

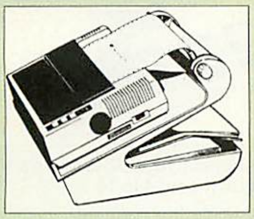
Canon Bubblejet Printers

	Printer	CSF	2nd Bin	Ink Cart
BJ10EX	£156	£43	–	£16
BJ10SX	£169	£43	–	£16
BJ200	£275	–	–	£16
BJ230	£299	–	–	£16
BJ300*	£319	£88	£88	£12
BJ330*	£369	£110	£79	£12
BJC800C	£1345	–	–	£16

- BJ10EX/SX Jumbo Ink Refill pack (twice cartridge volume) £12
- Spare Battery pack for BJ10EX £33

* includes 12 months on site warranty

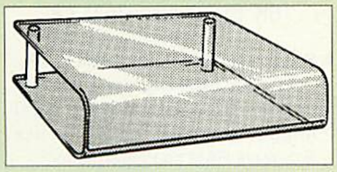
Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £19
132 Column version £29

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version £16 (carr £3)
136 Column version £20 (carr £4)

24-Hour Credit Card Order Line (0923) 233383 or 250234

Universal Printer Sharers

Connect up to 4 Micros to 1 printer or 4 Printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Sharers

Connects	Serial	Parallel
2 to 1	£10	£10
3 to 1	£14	£15
4 to 1	£19	£20

Professional Sharer Units

Connects	Serial	Parallel
2 to 1	£15	£16
3 to 1	£20	£23
4 to 1	£30	£34

Auto Printer Sharer Switch

Connects	Serial	Centronics
2 to 1	£34	£36
4 to 1	£52	£53
8 to 1	–	£85

256K Multi Spooler

These Parallel Auto printer sharer switches have built-in 256K Buffer.

- 2 In / 2 out £125
- 4 In / 2 out £139
- 8 In / 1 out £185

(Cables for all printer switches are from £5 each please specify the type required when ordering.)

Compact Converter Unit

Serial to Parallel & Parallel to Serial £32

Listing Paper (Perforated)

- 1,000 Sheets 9.5" x 11" Fanfold Paper £7
- 2,000 Sheets 9.5" x 11" Fanfold Paper £11
- 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold £21
- 1,000 Sheets 15" x 11" Fanfold Paper £9
- 2,000 Sheets 15" x 11" Fanfold Paper £16
- 1,000 Sheets true A4 Fanfold Paper 70gms £11
- 2,000 Sheets true A4 Fanfold Paper 70gms £21
- 500 Sheets A4 80gms Bond £3.50

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Cross Over Manual Switch

2 In/2 Out Parallel	£29
2 In/2 Out Serial	£28
3 In/2 Out Serial	£36

Commander Joystick

Features:

- Direct connection to BBC Analogue input port –
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Price: £15

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	£6.00
1,000 90 x 36mm (Twin Row)	£6.25
1,000 90 x 49mm (Twin Row)	£7.50
1,000 102 x 36mm (Twin Row)	£6.75

Laser Printer Labels on A4 Sheets

3750 – 70 x 29mm (3 Rows x 10)	£15.50
2400 – 70 x 37mm (3 Rows x 8)	£15.25

Listing Paper (Perforated)

- 1,000 Sheets 9.5" x 11" Fanfold £7
- 2,000 Sheets 9.5" x 11" Fanfold £11
- 1,000 Sheets 9.5" x 11" NCR 2 Part £21
- 1,000 Sheets 15" x 11" Fanfold £9
- 2,000 Sheets 15" x 11" Fanfold £16
- 1,000 Sheets true A4 Fanfold 70gms £11
- 2,000 A4 Fanfold Paper £19
- 500 Sheets A4 80gms Bond £3.50

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
BBC B/BBC Master	–	£6.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£3.25	£6.00
EX800/1000	£6.00	£6.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£6.00	£6.00
LQ400/500/550/800/850	£5.50	£6.00
LQ1050/LQ2500	£12.00	£6.00
LX400/800/850	£3.50	£6.00
M1009/GLP	£2.95	£6.00
NEC P2200	£4.50	£6.00

Dust covers for most 80 column printers available at £6 each

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Type

Connects	Serial	Parallel
2 to 1	£10	£10
3 to 1	£14	£15
4 to 1	£19	£20

Professional Type

Connects	Serial	Parallel
2 to 1	£15	£16
3 to 1	£20	£23
4 to 1	£30	£34

Cables from £5 each (see cable section)

Auto Printer Sharer

Connects	Serial	Parallel
2 to 1	£34	£36
4 to 1	£52	£53
8 to 1	–	£85

Compact Converter Units

Serial to Parallel	£32
Parallel to Serial	£32

Voltmace Joystick

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 14B Single Joystick	£11
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24
Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128	£25

Beeb PC (BASIC)

Designed for program authors to convert BBC programs to run on IBM PCs.

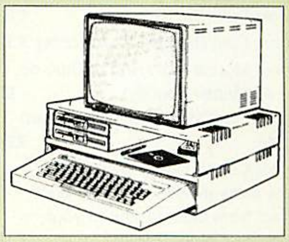
Price: £38

256k Multi Spooler

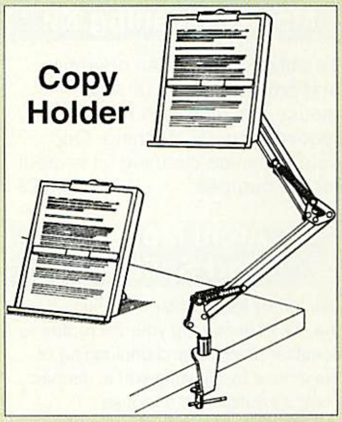
These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

- 2 In/2 out £125
- 4 In/2 out £139
- 8 In/1 out £185

Plinths for the BBC Master and A3000



- Single 490 x 310 x 105mm £14
- Double 490 x 310 x 210mm £27
- A3000 Single Plinth (very sturdy & precision made), has a slot on the left for the switch & cut out on the right for 3.5" Disc Drive £15



Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip.

- Desk Top **£8**; • Angle Poise **£12**

NEW Copy holders as above but with a battery operated, remote controlled cursor/ruler. (By hand or foot pedal.) (Batteries 2 x AA not included.)

- Desk Top **£15**; • Angle Poise **£20**

Surge Protector Plug

Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage translent spikes/surges caused by lightning or thermostats switching.

Protection for only **£8.50**

4 Way Mains Distribution Socket

4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required.
Very useful for tidying up all the mains leads from your peripherals. **£9.50**

Aries Spike Cleaner Unit

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete Computer/Hi-Fi System **£16**

Continued→ → → → → →

QUEST MOUSE Mk III

- Quest Mouse III & Quest Paint £39
- Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £59
- Quest Mouse III only £25
- Quest Paint Software only £23
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Conquest (Quest Paint Extension) ROM £24
- Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18
  (P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

Mouse Cleaning Kit

To obtain trouble free operation and prolong the life of your mouse, the high tech rodent requires regular cleaning. Our deluxe mouse cleaning kit is ideal for the purpose £3

Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. £15

Mk III AMX MOUSE

- **AMX Mouse plus Super Art £39**
  (Please specify for BBC, Master or Compact)
- AMX MOUSE ONLY £25
- AMX SUPERART Package £20
- AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse £18
- PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker £13
- AMX DESIGN (ROM) £23
- AMX EXTRA EXTRA £16
- MOUSE MAT £3

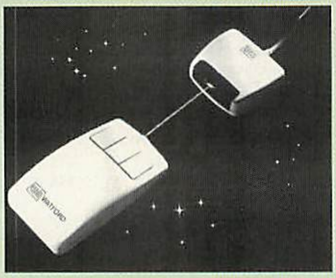
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive etc.

Only £3

Archi Cordless Mouse

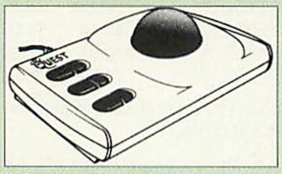


Features
- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads
- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 minutes inactive
- Auto Power Shut-Down after 20 minutes inactive

Price £29

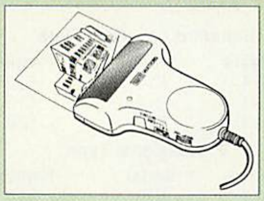
Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version £25
QT-20 Archimedes Version £26

Beeb Hand Scanner



Watford Beeb HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs!

Beeb HandScan & Firmware £99

Archi Mk II Hand Scanner

Watford's Mk II hand scanner has a maximum resolution of 400 dpi. The scanning width is 4". The sophisticated software is supplied in a 64K ROM, located on a standard single width expansion podule. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. Other facilities include Cropping and scaling to any size including stretching and squashing in X and Y directions separately. Colour tinting. X and Y flip. Edge detection which turns solid objects into outlines. Images can be printed on any printer supported by RISC OS.
On-screen help is provided via the RiscOS interactive help facility. (Please write in for full technical details).

AHS-4 Archi 300/400 Version £109
AHS-3 Archi A3000 Version £119

Award winning Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Wapping Editor Software Pack £39
Wapping Editor plus Mouse £59

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc. Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out. **£15**

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are two Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions. **£12**

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only). **£13**

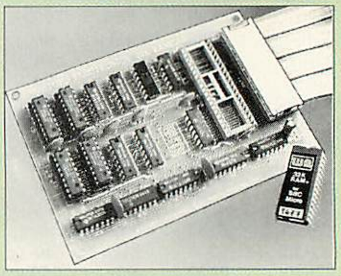
Archi A4 Scanner



The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures. Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.
Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.

Archi A4 Scanner	£239
Sheet Feeder for above	£75
Scanner + Sheet Feeder	£309

32K Shadow RAM/ Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

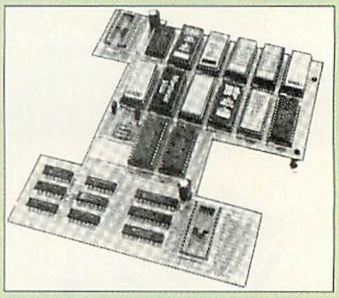
Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free – 5 times as much as normal.

- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.

Only £49

Solderless Sideways ROM Socket Board



- Increases your BBC Micro's ROM capacity from 4 to 16.
- **No soldering required.**
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish" allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32
Battery Backup fitted **£35**
Battery Backup only **£3**
16K Sideways RAM **£8**

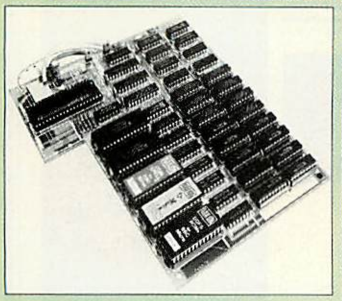
- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer. **Only: £8**

Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below). **£14**

Watford POWER DUCK £8

ROM/RAM Card



- No Soldering required to fit the board.
- Compatible with BBC B
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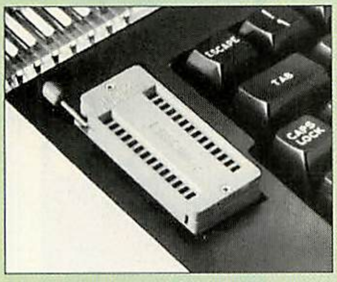
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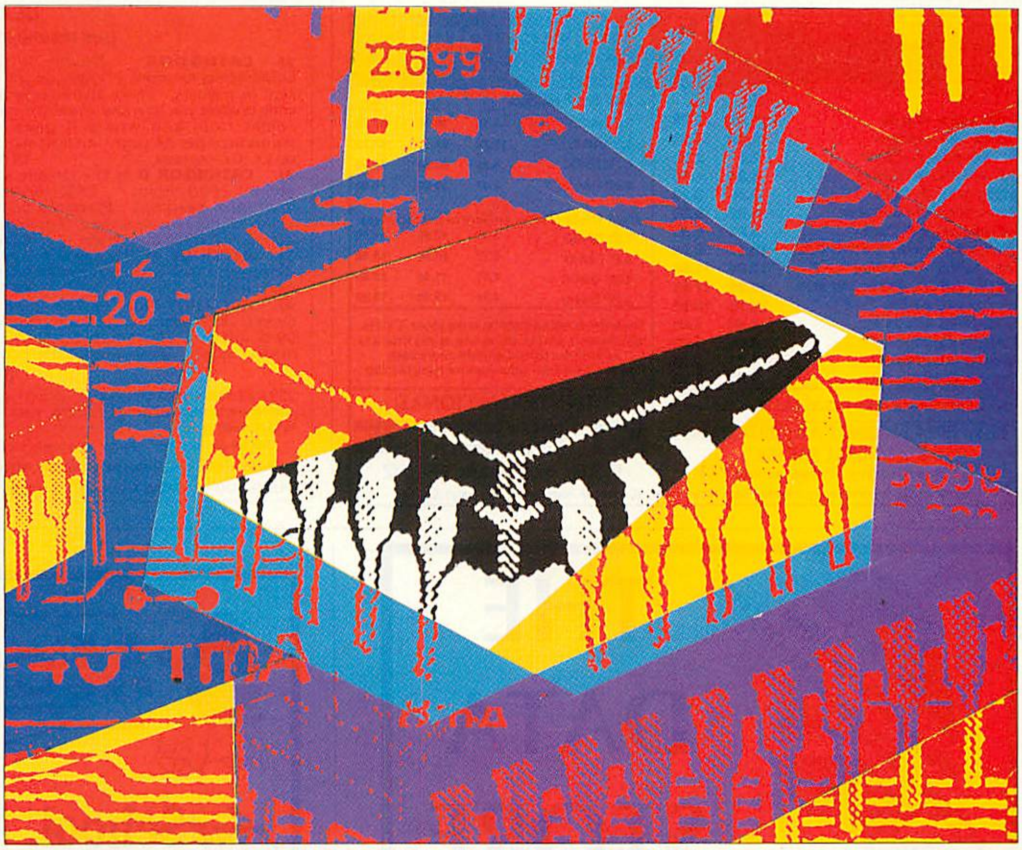
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Gavin Burns looks at the tiny pieces of silicon that make your machine tick

ABSOLUTE BEGINNERS

The Great British public has a passion for chips. Pie and chips, cod and chips. Readers from north of Watford will even be familiar with the peculiar idea of chips with gravy. 'Chips with everything' could only have been coined in the UK.

But if you put down that greasy wrapper and pay attention for a few minutes, we are going to be dealing with a different breed of chip altogether: the chips that hang out inside the computer. Five main chips make up the computer's brain. You may have heard of the great Arm chip. In fact you may even be bored senseless hearing about it. The Arm chip, the central processing unit (CPU), thinking machine, mastermind of the computer. It takes instructions, executes them and bosses the other chips about. Top chip. It is roughly equivalent to the PC's 286, 386 or 486 processors.



ANDY LOVELL

The Arm2 chip first appeared in the Archimedes A300, A400 and the A3000. The existence of an Arm1 is open to debate. Many machines have been upgraded with an Arm3. This has an extra bit of memory (4K) inside it, known as a cache. This speeds things up phenomenally, making it four or five times faster than the inferior Arm2. The cache stores the last few items to go into the processor, so, instead of recalling data from the machine's memory, which would take a considerable time, the Arm grabs it from the cache.

Between the machine's Ram and the Arm we find Memc, the memory controller. When the Arm chip is ordered to find something in memory, Memc looks for it and finds the correct data. One Memc can handle up to 4Mb of Ram, but you can have 1, 2 or 4Mb; Memc accesses this memory.

In easy-to-understand terms, imagine an incredibly long street with some occupied houses (Ram chips that are present) and a number of empty ones (Ram chips that are not present). Memc is the postman and the Arm chip is trying to contact only the occupied houses. Memc finds these houses and directs Arm to them. A sharing relationship.

Screen display and sound are controlled by Vidc. Inside the computer's Ram an area is set aside for the screen display to be stored; every dot and pixel. Vidc works in conjunction with this video Ram. by grabbing information from the video Ram, faster than the eye can see, and throwing it onto the monitor. Every time you type in a letter this process occurs, so you can imagine the speed it works at. High resolution modes are slower because there is more for the chip to hurl onto the screen.

The same process can be applied to sound. Vidc grabs digitised sound from memory and sends it out through the machine's speaker. Vidc10 offers the sound quality of a telephone. However, the Vidc20 has CD sound and 24-bit graphics, so you have more colours on-screen.

Interfaces, printers, serial ports and expansion type things are dealt with by the input/output controller, the IOC chip. It acts as an interpreter between the Arm chip and just about everything that plugs into the computer. If you demand that something be printed out, the Arm chip orders the IOC which in turn has a word with the printer.

What about the Arm250, as featured in the A3010, A3020 and A4000? Well, it's a real mish-mash of a chip, made up of an Arm2, a Memc, an Ioc and a Vidc all in one case. Value for money, or what?

Finally there is the Risc OS chip set, made up of four Rom chips. This contains the ultimate program, known as the operating system. The Arm chip runs it and is what you see on your screen. *Paint*, *Draw*, the desktop environment, that handy little clock; they all happily live inside this chip. The Archimedes is quite stupid without it.

Getting Resultz

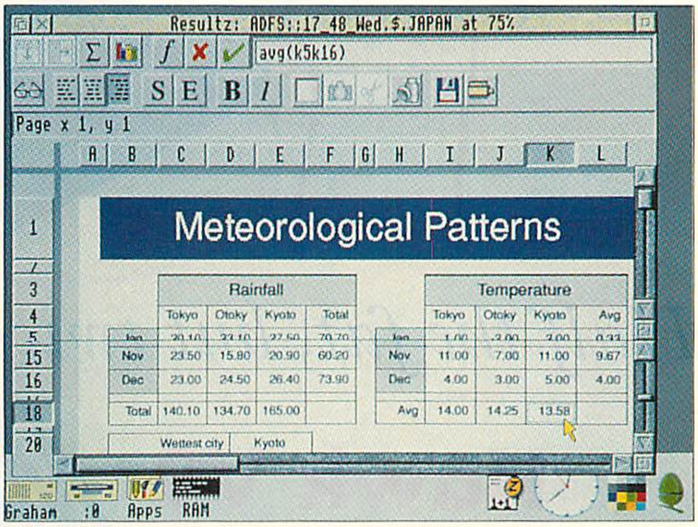
Resultz is the second stage in Colton's replacement of Pipedream. Graham Bell looks at a preview version to see how the spreadsheet meshes with Wordz

Colton Software has long persisted with *Pipedream* – it's been the company's mainstay since its inception. But this year, it has embarked on a renewal, with a new family of applications, *Wordz*, *Resultz* and an as-yet-unchristened database (our bet is on *Recordz*).

The three family members share a common file format: there is no distinction between a wordprocessor document and a spreadsheet. The differences arise because each application allows you to manipulate that document in distinct ways. A table of calculations originally entered in the spreadsheet will look just the same in the wordprocessor, though changing a figure doesn't cause the grid to recalculate. On the other hand, the spreadsheet can edit text. But *Resultz* cannot check your spelling, nor count the words.

The two applications share a common core of software, the distinction being more in the user interface than in the functions provided by the core. The spreadsheet can edit even fully-justified text since justification functions are provided by the core – and this preview was typed using *Resultz*. But it cannot change ragged text to fully justified, if only because it lacks the button to do so. This offers the possibility of combining the functionality of both. If you buy both, a minor upgrade to the current version of *Wordz* is needed anyway.

Like *Wordz*, or indeed *Eureka*, *Resultz* maintains a collection of templates, from which you choose when opening a new spreadsheet. A new *Resultz* document appears in a window with cells and gridlines, surrounded by normal spreadsheet-like row and column markers. A *Wordz*-like button bar and status line are supplemented *Excel*-style by a row of buttons for spreadsheet-only functions like graphing and auto-sum, plus a space for entering functions.



Multiple views on a single spreadsheet with Resultz

RESULTZ FEATURES

Interestingly, *Resultz* (like *Wordz*) has a split window option, where the screen can be divided into four scrollable regions. But, in contrast to *Eureka*, it does this without ditching Acorn's window.

Unusually for a spreadsheet, *Resultz* is page-based. It shows the page breaks and print borders on screen, breaking big spreadsheets up into blocks. It always shows what will print – distracting, yes, but it follows the approach of the wordprocessor. My complaint here is that the margins are measured relative to the printable area, not to the edge of the paper: I've never come across another application that does this.

All the spreadsheet functions are there, and are remarkably similar to *Pipedream 4*. Date and time calculations, statistics, string handling, the database lookup functions, and the custom function language remain almost unchanged. Colton claims the final version will be fast too, with calculation speed twice that of *Pipedream 4* and comfortably ahead of *Eureka* as well – obviously the unfinished application is not up to full speed yet. The 'Penguin graphics' charting remains, too, but it wasn't operating in the preview copy.

Matrix functions – where a single spreadsheet formula operates on a whole range of cells – are simpler than usual, as they don't need to be entered in a special way. The single sum (e1e10^2) works out the sum of squares of a column of figures; *Resultz* intelligently interprets the range as a matrix calculation.

Resultz has retained the styling system of *Wordz*. This is deliberately *Impression*-like, in that styles are layered, and can be attached to any selected region, not just a paragraph as with most Macintosh software. Attributes undefined in a particular stylesheet are inherited from a previously-applied style underneath, right down to a BaseText style which controls the look of the text. Changing a stylesheet retrospectively alters the look of all text using that style. In contrast, effects are local. Both styles and effects give access to all usual text attributes, background colours, borders, plus of course an *Excel*-like range of number styles. Of course they cannot cope with type families with more than four weights, or with odd names, but there is a Fontmap file which can be altered to link fonts together conveniently. (This will also ease the transition of *Wordz* and *Resultz* files to *Windows*.)

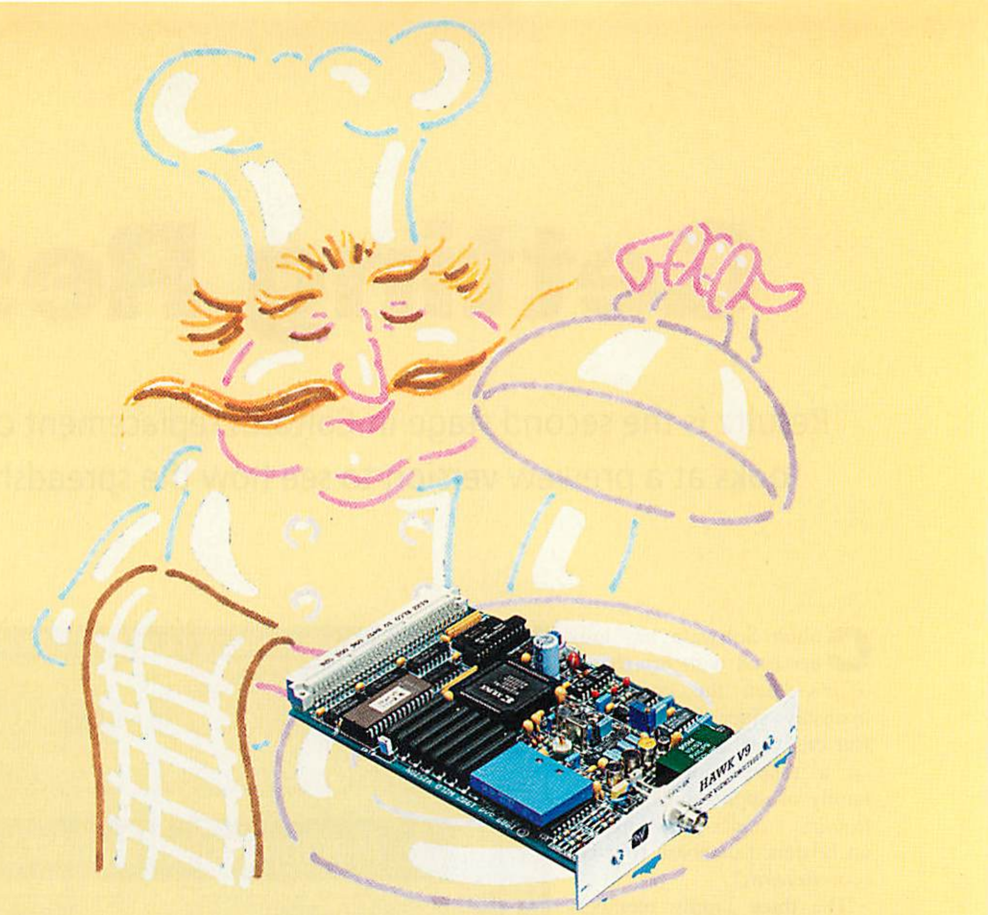
Two other features are worth emphasising. The first is that sprites and drawings can be imported onto the spreadsheet. The second is that cells of the spreadsheet are not fixed in a columnar grid; you can select a group of cells then make them wider, without affecting the width of unselected cells below. The result might be that a single cell could lie above a group of three cells. These features, combined with its page-based nature, make *Resultz* superb for table creation – things like charts and forms.

CONCLUSION

The sum of *Resultz* and *Wordz* is very close to *Pipedream*, and criticisms of *Pipedream* centre mainly on the schizoid user interface and its character-based orientation. By offering two quite separate interfaces – a real wordprocessor and a real spreadsheet – and by incorporating full typographic style and effect control in a familiar way, *Wordz* and *Resultz* counter that criticism effectively.

Colton say that *Resultz* will be priced between £120 and £130 and *Rezultz* plus *Wordz* should make a good pair, though their combined price will be greater than that of *Pipedream* alone.


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Icon class

Jack Kreindler, our very own icon designer describes how he puts his theories into practice

Vision is the quickest, most effective way of assimilating information about our environment, particularly if the information itself concerns artwork. So it makes sense that graphical user interfaces (GUIs) have developed as the preferred mode of communication between computer and operator.

The strength of any GUI lies in the quality of the graphics representing window functions, filetypes and applications. These images are called icons. Application icons generally require the most careful thought, offering the widest scope for design considerations and artistic initiative. Icons have become commercially important as the success of their design strongly influences the initial impressions given by a product.

So, software houses, in the face of tough competition, have put increasing effort into icon design. Acorn recently responded to this trend by vastly improving the aesthetics of the Risc OS GUI. In doing so, it silenced the moaning masses who complained that Microsoft Windows 3.1 looked infinitely better than Acorn's outdated desktop. But good icons should not only be the province of software companies and the writers of operating systems. Everyone's desktop can be individualised and enhanced through creating their own icons.

Many elements go to make up a successful icon. It must be original but also bear family resemblance to related applications. It has to be distinctive, and reflect the application's type and purpose. All in the space of 100 or so pixels.

Note that this list does not include complexity, which usually clutters the precious space available, causing loss of clarity.

The best icons are conceptually simple, and use visual cues that are suggestive, rather than complex, literal imagery. This idea is based on the idea of visual association. For example, if there was a *Draw*-style pencil within an icon, you would associate the application with vector graphics. A paintbrush would make you relate it to sprite editing.

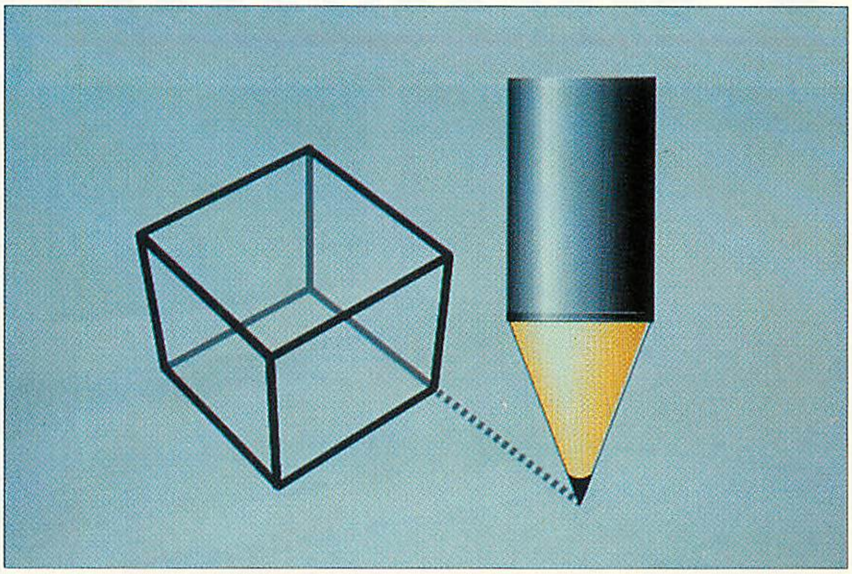
Since its overhaul, the *Acorn User* disc has needed three or four icons to be designed for each issue. Last month, one of the main features was the 3D geometrical-shape designer for which an impressive icon was essential. My brief indicated the nature of the 3D designer: that it wanted definite reference to 3D geometry and a creative tool for designing.

THE SOFTWARE

I started with *Draw*, for its ability to modify and fine-tune basic outlines and forms, without hassle. *Revelation Pro* was the choice for composite editing.

This program, though irritating to use in many respects, lets you easily grab screen images and superimpose them onto the design. The program has an excellent tool called Blur that anti-aliases jagged edges, greatly enhancing the on-screen appearance of small-scale images such as text and icon components.

Paint is the most suitable and user-friendly tool for grabbing screenshots and for size adjustment, and for previewing and final pixel editing of the icon. However, the first tools are a sheet of A4 and an HB pencil. It is almost impossible to conceive a rough design using a drawing or painting package, and it is very time consuming. I always sketch my ideas on paper and go through a process of elimination – deciding on the sharpest design, and ideally the least complicated one, that fulfills the core objectives.



The icon for 3D design fulfils all the criteria. It is simple enough to be reduced and can quickly communicate the purpose of the application it represents

ICON CREATION

Over the page is a description of how I created the icon for three-dimensional programming that first appeared on the *Acorn User* subscriber's disc in May. The original brief was for an icon to fulfil two components: some form of 3D structure and a design instrument.

The first idea that sprang to mind was a solid cube with no shading and the green *Draw* pencil placed beside it but this lacked a feeling of three-dimensional geometry and the pencil seemed very detached from the cube. Our final version overcomes these problems and should give you ideas for designing your own icons,

The stages described in our example may change slightly depending on which packages you use. For example if you have *Artworks* from Computer Concepts, you will be able to do much more than the basic outline shapes during the drawing stage. Using *Artworks,* I have created images that need only minor editing within *Paint* to produce the finished icon.

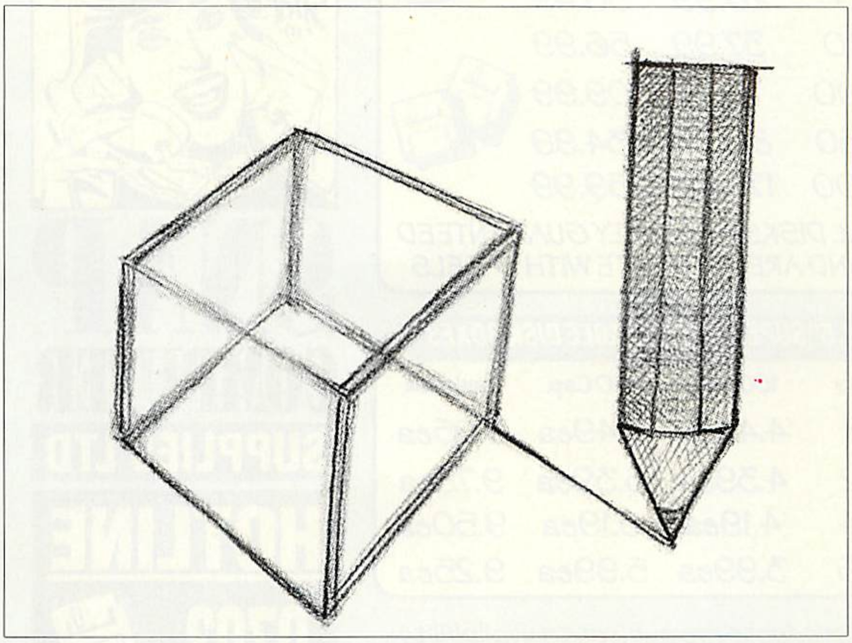
Finally, you may want to add a border or a 3D mount. See how other icons have used this effectively, and experiment with the idea.

If your low-resolution conversions look like a heap of randomly-placed pixels, it's advisable to do a design rethink from a Mode 12 starting point. Generally speaking, the less cluttered the original design, the less likely a low resolution disaster is to occur. Our final 3D icon can be seen on this month's subscriber's disc.

1 CONCEPTION

While searching for a way to visualise a 3D object in its construction, I remembered my first experiences with 3D graphics and rendering packages, like *Euclid* and *Illusionist*. It dawned on me that they all used wire-frame modelling at the design stage. A wire-frame image has connotations of vectors and would help to convey the mathematical aspect of the program. I returned to the original cube idea as the central form, and decided a classic perspective view would rate most highly on recognition rating.

A fundamental rule that must be remembered is that you are limited by the confines of a square or landscape area of space. It is no good developing a design which is vertically-oriented because it won't fit in the windows or on the iconbar. To be more specific, you are limited to 37 pixels in the *y* axis and 60 in the *x* axis. High resolution icons tend to be in the 34 x 34 format to maintain consistency with Acorn's file and application icons. Before the next stage, I had to consider the following points. There are three types of Acorn application icon: low resolution (found in files named *!Sprites*, Mode 12); high resolution (*!Sprites*22, Mode 20) and high resolution monochrome (*!Sprites23,* Mode 22). You needn't worry about the last of these as the vast majority of monitors are only capable of the first two types of screen display. Though the computer will automatically reduce a full-sized icon on selecting the Small icons display option, you may want to create dedicated small icons.



At the conceptual stage you cannot beat the versatilty and speed of a good ol' fashioned pencil and a piece of paper

Technically, it is far wiser to do the design work in a high-resolution, square-pixel mode, like 20, 27 or 31, down-converting a copy of the finished icon to low resolution with *Translator*, *Change FSI* or by snapshotting the sprite file in mode 12.

I used an extended Mode 31, available with the ColourCard, but any 16-colour, high resolution mode will do. If your hardware cannot support high resolution modes then you will be limited to designing low resolution icons only.

2 DRAWING THE ICON

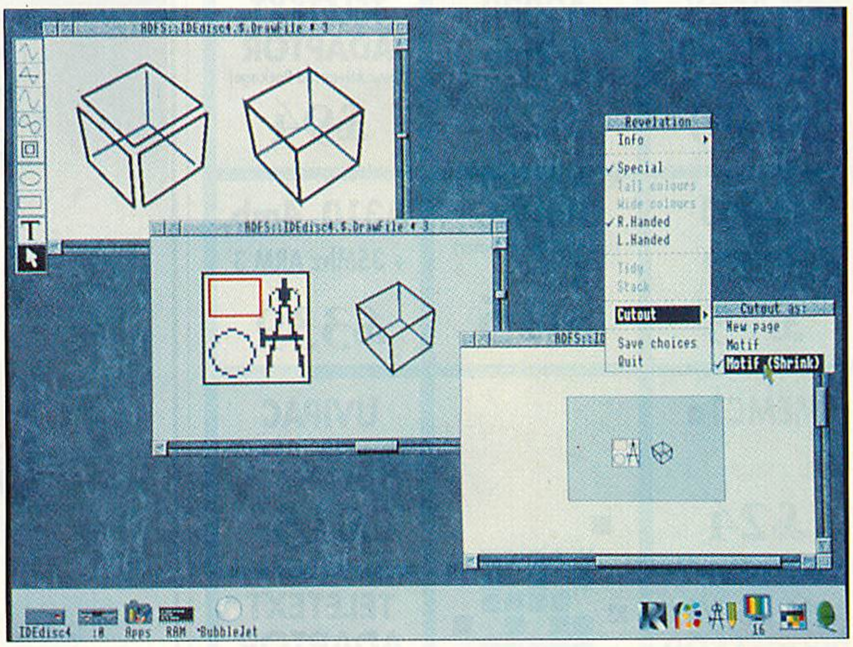
Vector graphics allow you to modify lines and objects without difficulty. For this reason, *Draw*, or any other drawing package, is invaluable. For the 3D icon, I wished to create the same realistic 3D cube I had drawn on paper. This would demand a fair amount of manipulation to achieve accurate angles for the lines.

The cube comprised three quadrilatrals. These formed the top, and the two foremost sides. Line colour was kept as the default black, and no fill colours were added. The illusion of wire-frame transparency was created by adding the three remaining lines. These were coloured grey to force them into the visual background (just as buildings in a city skyline lose contrast, becoming lighter, the further away they are). This was to prevent the Neckercube effect, where the eye flips between two viewpoints, unable to register the perspective in the wire-frame.

Having completed the cube, and grouped the components, it was necessary to scale it down to the correct size, before taking a screenshot. To help do this, I dropped the sprite file of a standard-sized icon, and shrunk the cube to approximately the same size. The next job was to zoom out of the *Draw* window until the sprite I imported was at 100 per cent size, then take a snapshot of the image, using the cutout facility in *Revelation*.

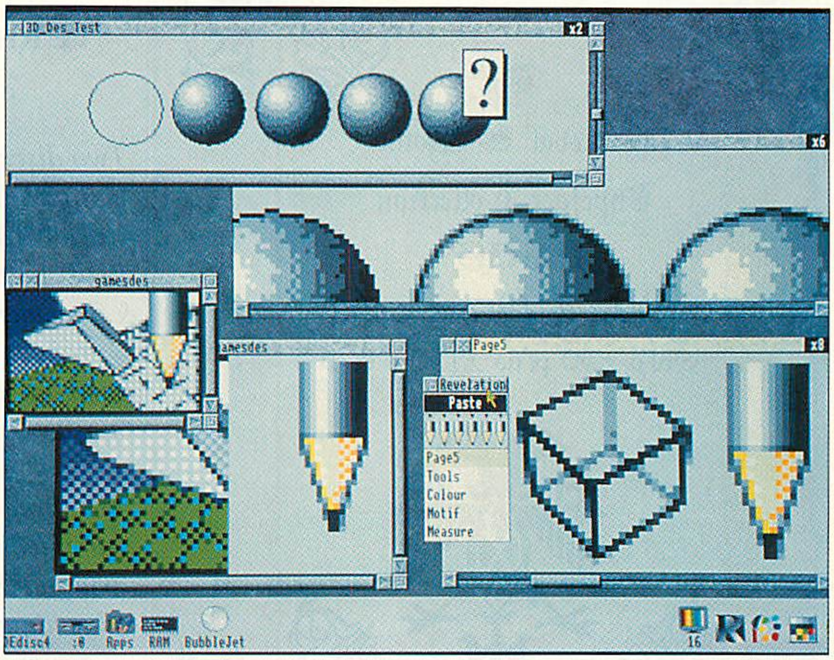
The directory window backgrounds and the iconbar are coloured the lightest shade of grey in the standard 16-colour palette. This should be used as the paper colour (or background rectangle colour) in the drawing package. When loading the sprite into the painting program, remember to pre-fill the background with this same grey before importing the snapshot of the *Draw* file.

You should also avoid drawing lines that are angled close to vertical or horizontal. They will look very untidy, appearing as a staggered chain of lines. Compromise in your design will avoid this problem.



Draw is the perfect tool for this part of the design process. However, for those with a less artistic eye, it could also be achieved using Euclid and then exported to Draw

3 THE PAINTING PACKAGE



Much of the shading is achieved within Revelation Image Pro: a pixel-based package from Longman Logotron

I loaded the cube into *Revelation Image Pro.* and used the Shrink option from *Revelation*'s Cutout menu. This removes the background, cutting out the image from where the background meets a change in pixel colour: at lines and edges, say.

Images acquired using the Cutout facility can be moved within the *Revelation* window, appearing as a floating sprite. When you are happy with the position, the sprite can be pasted.

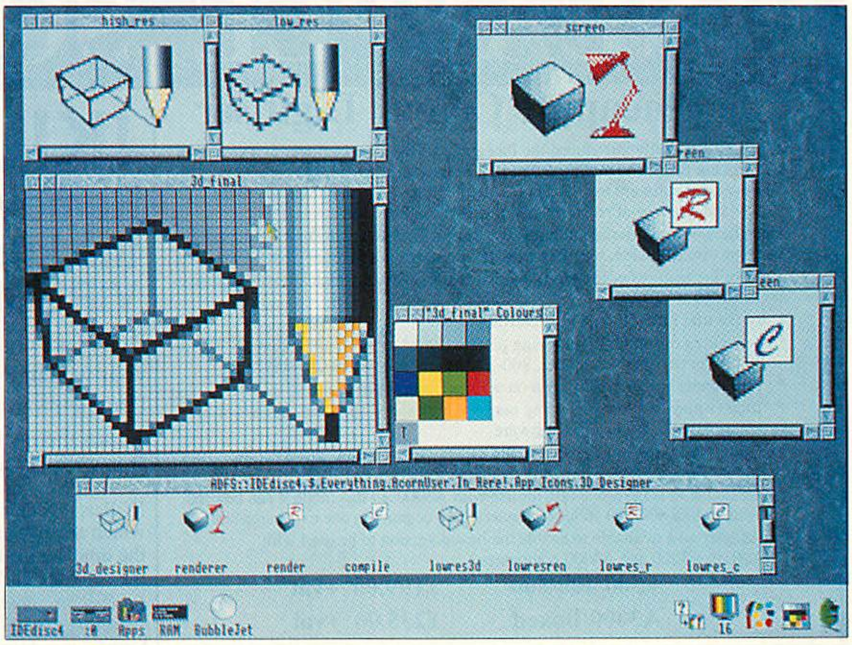
I had originally planned to incorporate the *Draw* pencil in the icon, but although it has a strong association with design and graphics, it looked rather flat standing next to the cube. The other drawback was that *Draw* is a 2D graphics package and not really anything to do with 3D modelling. After some deliberation I felt that the pencil needed a relief quality.

This would need shading, which in turn needs many tones of the same colour, and when restricted to 16 colours, greyscales have to be used. The pencil I used in an *Acorn User* disc icon for the *Games Designer* application sprung from the depths of my memory. I decided to use this one instead of starting another from scratch.

It is not hard to edit icons, and this can save much effort. Paint over the unwanted areas using the lightest shade of grey, for reasons explained above, then simply cut and export. This is exactly what I did with the pencil from *Games Designer*, pasting it beside the cube. To connect the design tool to the design object, I extended one of the cube's lines to the point where the pencil tip stood, completing the composition of the icon. The lines of the cube needed to be anti-aliased, and this was done using the Blur tool.

After a little editing was done, to remove the unwanted softening of horizontal and vertical lines, the image was ready for the final edit. A tip here is to use the lowest level of blur initially, as too much can remove the definition of the lines. Anti-aliased text can be created in *Draw* and transported in the same way as the cube.

4 FINAL EDITING



The final creation is transformed into the small icon. You can see it in action on the Acorn User subscriber's disc

Paint is far and away the best program for post-production editing. I cut an area of the icon from *Revelation Pro* into *Paint*, having changed into Mode 20 (as high resolution application sprites must be in Mode 20 as standard). I then moved the relevant pixels into the bottom left-hand corner using the scissors tool, and edited the sprite size to an acceptable 35 pixels high by 47 wide. The light grey areas which were meant to appear transparent had to be masked. The mask colour is an option found in the Edit section of the main *Paint* menu.

Selecting the mask adds an additional block to the Colours window marked with a T (for transparent). You use the mask to make whatever is behind your icon visible within the sprite area; this means the grey area surrounding the icon will not appear on the Risc OS 3 pinboard, for instance. It can be confusing using the mask, as it appears as a medium grey in the *Paint* window, making the masked areas look anything but transparent. A global fill of the grey is the best way to mask the icon.

The high resolution 3D Designer, Renderer and iconbar icons were now finished. All that was left to do, before sending my little creations to the magazine, was to make low-resolution copies. *ChangeFSI* did an admirable job of the conversion, losing very little of the icons' essence, and hardly any editing was necessary.

If you do not have access to this program or *Translator*-type software, all you do is go into Mode 12 and take a snapshot of the icon in its sprite file window. And that's all there is to it. The original cube was also used in the rendering application and both icons were then used on the *Acorn User* subscriber's disc.

Remember you do not need the luxury of expensive software to create quality icons. and because of this, icon design is not the territory of graphic designers alone. Armed with a plan and a little ingenuity, just about anyone can transform, and personalise their desktop, and, in time, compile their own portfolio of miniature art.

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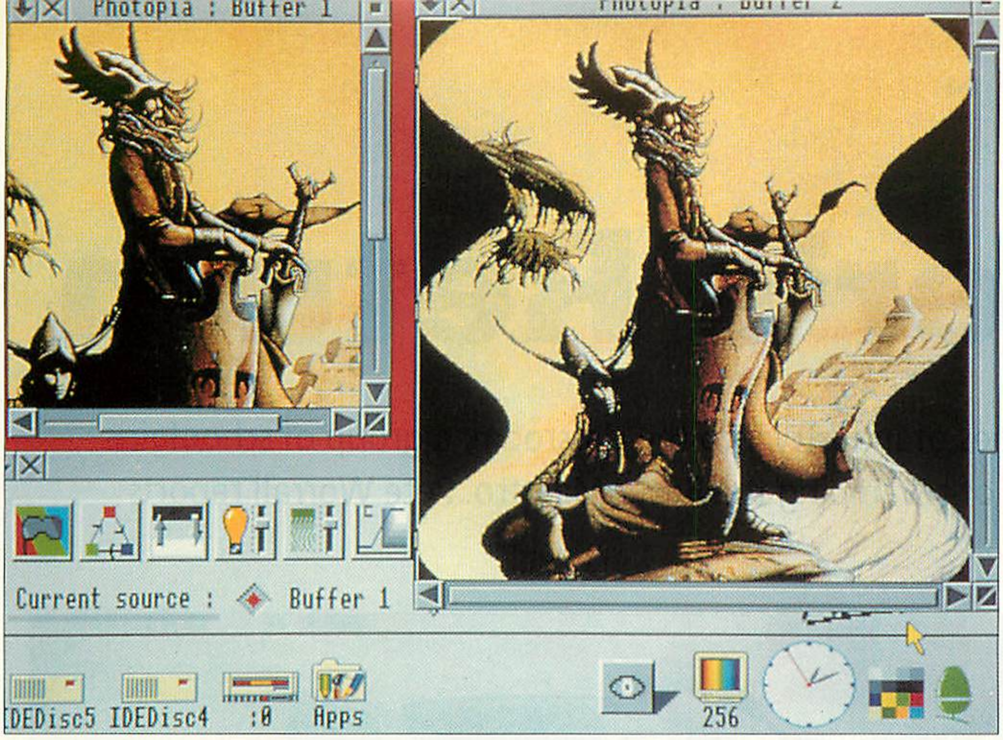
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An easy-to-use, effective image processor for under fifty pounds. Too good to be true? Rob Miller looks at Photopia

A change of image

Image processing packages are a strange breed. They normally fall into two distinct groups: those that are complex to use but provide powerful tools to transform pictures, and those that are simple but rather ineffective. *Photopia*, an entry-level image processing application from Cambridge International Software, is therefore quite a rarity. It offers a wide set of useful tools that do not require a degree in mathematics to use them.

Like any application worth its salt these days, Photopia is fully Risc OS-compliant and will run happily alongside other programs on the desktop. The ability to co-exist with other applications is extremely useful as *Photopia* does not contain any actual painting tools. You could run *Paint* alongside it (both programs will fit in a 1Mb machine) and drag files between the two.

If you're new to image processing, it's basically the science of altering a picture. It might be as simple as flipping it around the *x* or *y* axis, or could be the change of brightness of a particular picture. It's unlikely that you would find every image-processing tool in one package – image processing is a science in its own right – but *Photopia* includes most of the features you are likely to need. Dropping an image into *Photopia* for the first time produces three windows. One contains a selection of tool icons (the toolbox) and two more actually display the image. Two display windows are used to allow you to see the before and after of any effect.

Because of the nature of image processing, *Photopia* is designed to run in an eight-bit mode (with 256 colours) such as Mode 15 or 21, and will only function with 256-colour sprites. It will run in any other mode but you won't be able to see the effects of your actions. Pictures are, however, rendered mode-independently. This means that if you change an image in Mode 12 (16 colours) then switching to Mode 15 (256 colours) will allow you to see any changes.

WHAT DO YOU GET?

The tools in *Photopia* are divided into four sections. The first two groups deal with actions that affect the appearance of individual pixels (conversion from a coloured image to a greyscale image). The second two concern actions affecting the physical position of pixels (screen flipping and rotation).

All of these effects can be applied to all, or part of, an image but no option is given for irregular-shaped areas to be processed only rectangles. Rather than list every single tool, I'll mention the more unusual ones and what they do.

First on offer is Mask. This allows you to remove any of the red, green or blue components that make up a picture. This is similar to putting a negative colour filter in front of a picture and stopping any of that colour being seen.

Also in the first group is the Solarize tool. This reduces any picture to eight colours, resulting in an image that looks over-exposed. It's useful for a pop art look, and is particularly effective when used with digitised images.

Coloured washes can be applied to areas of pictures to give an effect similar to that of hand-tinted old photographs. Although the Wash tool works with colour pictures, it is more effective used on greyscaled images (which can be produced using the Greyscale tool). Graded fills are common in a number of art packages, but *Photopia* takes them a stage further and provides tools to fade pictures from light to dark or vice versa. Both linear and circular fades can be used to create rather clever spotlight effects.

The last two groups of effects are for transforming the shape and angle of pictures. Rotation through any angle is possible, as is the ability to flip an image about its *x* or *y* axis. Also stretching pictures is possible in a number of ways, including rippling as shown above. Images can be squashed into various shapes such as circles, ellipses and triangles. They can also be forced into a corrugated area to give a kind of fan-fold effect.

IS IT WORTH IT?

Although not perfect, *Photopia* is a good entry-level introduction to the world of image processing. The price seems about right although the cosmetic appeal of *Photopia* is somewhat lacking, and the manual could do with tidying up. But perhaps the biggest drawback is the slowness: even on an Arm3-based A5000, effects such as rippling can take up to five minutes on high resolution pictures.

However, the package includes most of the desired features and if you're prepared to sacrifice speed for price, you're likely to find *Photopia* a useful addition to your software library.

Product details

Product: Photopia
Supplier: Cambridge International Software
Tel: 071-226 3340
Price: £49.95

Rover's Return

To bring the realities of industry into the classroom, a group of schoolgirls took on the task of revamping the Rover Maestro. Pete Worrall reports

The design process in the real world is a complex and competitive business. Whether the product is a tube of toothpaste or a new monthly magazine, the final result should reflect teamwork, ideas and high tech skills.

The *Acorn User* team for example, consists of a group of people with specific jobs such as layout, publicity or sales, with everyone working together for next month's issue. So designing reflects both individual and collaborative effort.

It is difficult to replicate this design process in a classroom. Sandwell Education Authority, in the West Midlands, has tackled the problem in an innovative way, forming a partnership with the Rover Group at Coventry, working at the company's Partnership Centre. This enterprising project, now in its third year, is called Girls into Technology and takes the student directly into the world of work.

The project aims to show that technology is relevant to girls in their lives, learning experiences and in an industrial context, and uses art, design, technology and information technology. The Project was devised, and is coordinated and led by Sue Courtney-Donovan, an advisory teacher at Sandwell Educational and Microtechnology Unit. Also involved were Mary McGrath of the Sandwell Education Business Partnership and Bernard Zakary, the manager of the Rover Partnership Centre. The overall aim of the project was that students should gain an understanding of information technology and of its uses in society.

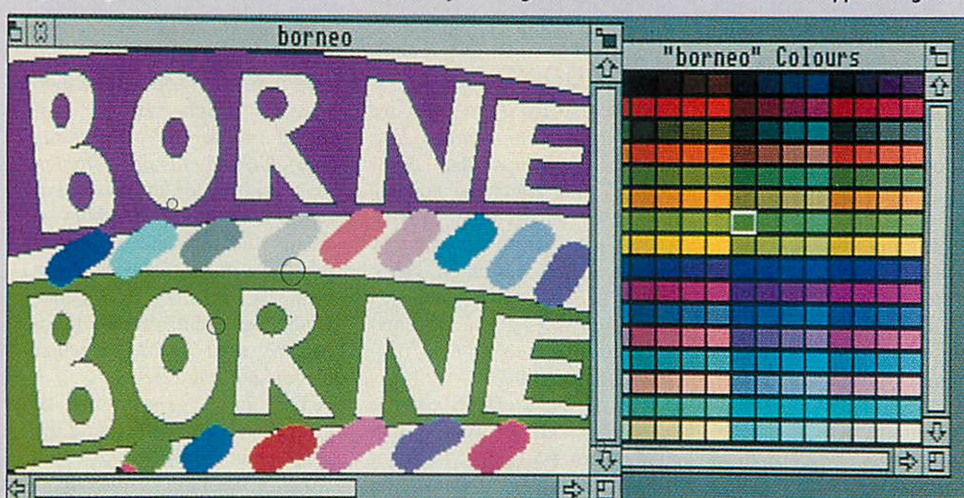
Each year the students tackle an extended design and technology task within an industrial context.



The original Maestro van: before its youthful tranformation

Exterior design group

This group redesigned the exterior, with extra side windows. They used a digitised image of the original van taken with the Canon Ion camera and edited using *Revelation 2*. They used *Paint* to explore colour combinations, painting direct onto the digitised image. The girls decided to use green, black and grey. They were given the name for the van – Borneo – by the Commercial Group. This interactive process developed during the week and the Exterior Group experimented with logo shapes using *Draw* and decided to use the logo on the van's side. As *Revelation 2* accepts *Draw* files this was used to scale the logo. Alice and Julia felt it was important to have the logo on the side to make the vehicle appear brighter.



Commercial group

The Commercial Group had to provide the promotion material to introduce and sell the new van to the consumer. This activity was perhaps the hardest task faced by the three groups.

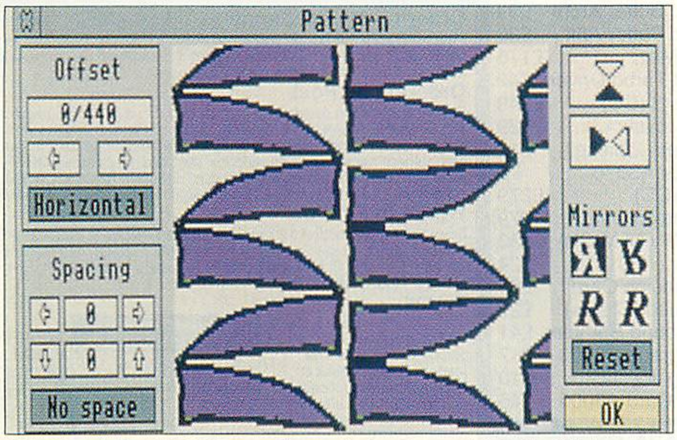
Market research using Longman Logotron's *Pinpoint* revealed that an environmental angle was seen as advantageous to sales.They considered using a panther as a marketing angle because it was wild and free. With more research and the help of a CD-Rom reference they discovered the panther's habitat to be The Sahara, Sumatra and Borneo.

After more market research Borneo was chosen. Slogans were then prepared using *Pendown*, the two favourites being 'the captured Maestro runs loose and wild' and 'the beast is free at last.' Laila explained: 'We thought this was appropriate for young people today because they are into saving animals and offering them freedom.'

The next important task was to design a poster using the final van design, the logo, the panther and a suitable background.

As the final deadline was looming, the Canon Ion was the ideal camera to quickly snap a number of green backdrops for the poster. These pictures were digitised using the Pineapple Colour Digitiser and everything put together using *Revelation 2*. On the last day of the project all three groups presented their research and the revamped Borneo Van.





Using Revelation 2's Pattern option to design the van's interior fabric

This years' task was given to Year 10 West Midland secondary students from Bristnall Hall, Holly Lodge and Shirelands schools, a few weeks before their week at Rover.

The task consisted of the following brief. 'The Maestro van is an ageing product with sales in decline. Marketing has identified potential sales if modified for recreational use to fulfil the aspirations of 18 to 30-year-old owners. Financial constraints restrict major body panel change but minor panel modification can be considered. Development of a new suite of moulded components can be considered to enhance the package, together with accessory kits.'

The work was divided into three areas: interior design, exterior design and commercial. The commercial team would decide pricing, advertising and promotion.

On arrival at Rover the students were allocated to their working group. They met their industrial mentors (professionals at Rover) who discussed the brief, and established ground rules and schedules. Each had design expertise related to their group.

During the week the students worked in groups towards a solution. They used sketches, models, questionnaires and information technology to revamp the old Maestro into an exciting product for a niche market.

The three groups would work independently on their areas, communicating with the other groups as they needed to. For instance, the commercial group would work on their own on a name for the new product. As soon as they had one they would need to give the information to the exterior design group so that they could translate the concept into an external look for the van. This is where the union of individual and collaborative effort come in.

I worked with the interior design group, watching their work progress and how they interacted with the other two groups to finish the project.

An 18-30 lifestyle board (collaged images and graphics) acted as the stimulus for initial discussions and work. Words such as energetic, fit, luxurious and sexy acted as image focal points for everyone.

Jasmin used *Pendown* to report the group's ideas. 'People in this age group are active and participate in a wide range of sports and leisure activities. The colours of their sport clothing are bright and vibrate against each other; this should be reflected in the interior fabric of the van.'

Revelation 2 was used to design the fabric because of the Pattern option on the motif menu.'Originally we had based our fabric pattern on swirls,' said Jasmin. The group changed its idea after discussions with the exterior design group, and decided on a co-ordinated approach using its logo shape as a starting point. The next stage was to repeat the design for the interior.

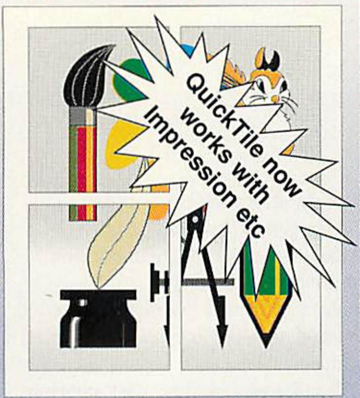
They found the process versatile, consisting of three steps. First they used the Tool menu to produce the drawing, then cut it out using Scissors (for a rectangular cut) or Knife (irregular cut) finally selecting Motif and Pattern. Options including mirror imaging, spacing alteration and vertical/horizontal pattern drops.

When you settle on a design you have to OK, create a new page, return to Tools, set the Fill Roller at Motif Tiled, and you see your design. The group finished by filling in a green background, co-ordinated with the colour of the top of the van.

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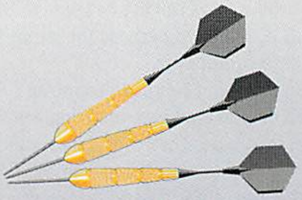
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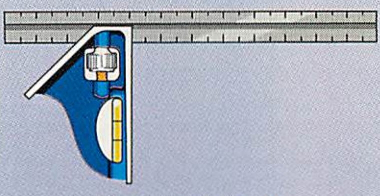
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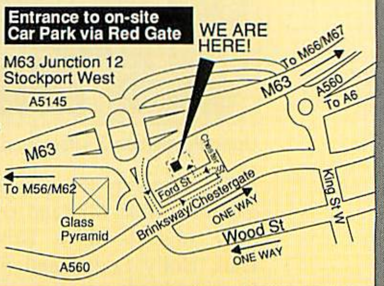
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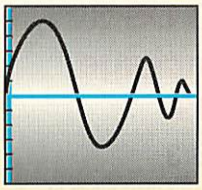
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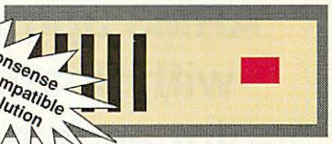


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Not suitable for A3k,A3010-A3020

40Mb 17ms	£175
120Mb 16ms Cache	£275
200Mb 13ms Cache	£375
330Mb 12ms Cache	£Call
520Mb 12ms Cache	£Call

Archimedes 2.5" Int Hard Card
Not suitable for A3010-A3020

80Mb 28ms **NEW**	£295
120Mb 28ms **NEW**	£375

add £15 to above for A3000 Ext

A3000/Archi/A5000 External

40Mb 17ms	£255
120Mb 16ms Cache	£355
200Mb 13ms Cache	£455
330Mb 12ms Cache	£Call
520Mb 12ms Cache	£Call

A5000 Second/Exchange Drives

For A5000's only.	2nd	Exch
120Mb 11ms Cache	£235	£185
250Mb 15ms Cache	£345	£295

A3020 Hard Disc Upgrades

80Mb Internal 28ms **NEW**	£249
120Mb Internal 28ms **NEW**	£299

HCCS A3000 IDE Hard Cards

20Mb Internal+User Port	£179
60Mb Internal+User Port	£269

HCCS Ultimate Multi-Podules

With IDE Hard Disc	A3000	A3010
20Mb Internal	£269	£269
60Mb Internal	£399	£399
80Mb Internal	£399	£399

SCSI

The following are complete hard disc systems comprising of a Morley SCSI interface, HardDisc, brackets, cables, disc & manual.

Archimedes Internal
Not suitable for A3k,A3010-A3020

120Mb 18ms Cache	£395
200Mb 18ms Cache	£545
330Mb 12ms Cache	£Call
520Mb 12ms Cache	£Call

A3000/Archi/A5000 External

120Mb 18ms Cache	£475
200Mb 18ms Cache	£625
330Mb 12ms Cache	£Call
520Mb 12ms Cache	£Call

Removable Hard Discs

44Mb (Inc one cartridge)	£499
44Mb Cartridge	£55

The above are ext units with card.

SCSI Controller Cards

Morley Uncached	£139
Morley Cached	£179

Acorn/Cumana Multimedia

Acorn Multimedia Expansion System **£499**
Comprises A4000 style case complete with power supply, SONY multi-session CD-ROM drive, pre-amplifier with headphone/phono inputs/outputs, CD caddy, etc. The unit can also house a 3.5" SCSI hard disc and another CD-ROM drive or Magneto Optical SCSI drive.

Add £100 to above for SCSI Interface (specify for which machine)

Cumana CD-ROM Multimedia Pack **£699**
Comprises CD-ROM drive, SCSI card, stereo speakers, 6 RISCOS CD-ROM titles, The Hutchinson Encyclopedia, Dictionary of the Living World, Revelation 2, The Illustrated Holy Bible, The Illustrated Works of Shakespeare, Sherlock Holmes on a Disc, !CDPlayer, 3 caddies, etc.

Magneto Optical Drives (SCSI)

128Mb Magneto Optical SCSI Drive 28ms 1" high	**£749**
External case for above	£69
128Mb Blank Discs	**£39**

Archimedes, A3000, A5000 Software

Applications

ABC Compiler (Oak)	£77
Advance (Acorn)	**£95**
Ancestry (Minerva)	£59
Arc DFS (Dabs)	£22
ArcComm2 (Logotron)	£52
ArcLight (Ace)	£40
ArcTerm 7 (Serial Port)	£62
Arctist (4D)	£20
Armadeus (Clares)	£65
Artisan 2 (Clares)	£49
Art Works (CC)	**£129**
Atelier (Minerva)	£69
AUN/Level 4 FileServer (Acorn)	£395
Autosketch v2 (Autodesk)	£65
Cable News (Lingenuity)	£165
CADet (Minerva)	£139
Chameleon 2 (4Mation)	£35
ColourSep (ICS)	**£15**
Compression (CC)	£35
Control Panel (Lingenuity)	£14
Desktop Assembler (Acorn)	£125
Desktop C (Acorn)	£180
Desktop Office (Minerva)	£95
Desktop Publisher (Acorn)	£125
Desktop Thesaurus (RISC Dev)	£19
Digital Symphony (Oregan)	**£40**
Draw Print-Plot (Oak)	£39
EasiWord 2 (Minerva)	£55
EasyWriter II (Icon Tech)	£126
Einstein (Ace)	£106
Equasor (CC)	£37
Euclid 2 (Ace)	£55
Eureka (Longman)	**£99**
First Word Plus v2 (Acorn)	£65
Font FX (DataStore)	£9
Gammaplot (Minerva)	£36
Genesis 2 (Oak Solutions)	£109
Graphbox v2 (Minerva)	£57
Graphbox Pro (Minerva)	£109
Hard Disc Companion II(RISC)	£45
Hearsay II (RISC Dev)	£69
Hotlink Presenter (Lingenuity)	£41
Home Accounts (Minerva)	£34
Illusionist (Clares)	£79
Imagery (Palette Studios)	£69
Impression v2 (CC)	**£125**
Impression Junior (CC)	£75
Impression Bus Supp (CC)	£39
Inter-Sheet II (CC)	£30
Inter-Word (CC)	£30
MasterFile III (RISC Dev)	**£47**
Midnight Express (Mid. Graph.)	£39
Mogul (Ace)	£20
Notate (Longman)	£54
Ovation (RISC Dev)	£95
PCB (Oak)	£99
PC Emulator (Acorn)	£95
PenDown Plus (Longman)	**£68**
Pin Point (Logotron)	£79
PipeDream 4 (Colton)	**£119**
Playback (RISC Dev)	**£17**
Poster (4Mation)	£75
Presenter 2 Hotlink (Lingenuity)	£33
Presenter GTi (Ling)	£66
Pro Artisan (Clares)	£79
ProArtisan2 (Clares)	
ProDriver DJ500C/550C (Ace)	**£39**
Realtime Solids Modeller (Sil)	£99
Render Bender v2 (Clares)	£99
Resultz (Colton)	£TBA
Revelation II (Logotron)	£110
Revelation ImagrPro (Logotron)	£127
Rhapsody v2 (Clares)	£49
Rhapsody v3 (Clares)	£79
RISCType (CIS)	£16
Rythmn Bed (Clares)	**£40**
S-Base Personal (Longman)	**£79**
S-Base Developer (Longman)	**£175**
S-Base Developer + (Longman)	**£275**
Schema (Clares)	£99
Serenade (Clares)	**£109**
ShapeFX (Datastore)	£9
ShowPage (CC)	£130
Sleuth (RISC Dev)	**£47**
SmArt (4Mation)	£50
SmArtFiler (4Mation)	£32
Snippet (4Mation)	£35
Sound FX Maker (CIS)	£32
Speech! (Superior)	£15
Splice (Ace)	£27
Squirrel Database (Dig Serv)	**£120**
Squirrel 'C' Developers Toolkit	£99
StartWrite (Icon)	**£55**
TechWriter (Icon)	£159
Titler (Clares)	£119
Topogropher (Clares)	**£69**
Touch Type (IOTA)	**£39**
Tracker (Serial Port)	£37
Turbo-Type (CIS)	**£20**
Tween (Ace)	£27
TypeStudio (RISC Dev)	£43
Vector (4Mation)	£75
Vox Box (Clares)	£49
WordWorks (CC)	**£38**
Wordz (Colton)	**£95**
Worra CAD (Oak)	£83

Games

2067BC (Oregan)	£17
Aggressor (Atomic)	£19
Air Supremacy (Superior)	£17
Alderbaran (Evolution)	£26
Bambuzle (Arxe Systems)	£19
Battle Chess (Krisalis)	**£22**
Black Angel (4D)	£26
Blaston (Eterna)	£15
Blitz (Arxe Systems)	£15
Boogie Buggy (4D)	£19
Break 147 & Superpool (4D)	£26
Bug Hunt, MoonDash (Min)	£15
Bug Hunt in Space (Minerva)	£15
Cataclysm (4D)	£19
Champions (Krisalis)	**£22**
-Includes Man Utd, J Khan Squash,	
-Wld Class Leaderbrd & Boxing Mngr	
Chess 3D (Micro Power)	£19
Chocks Away 2 (4D)	£19
Chocks Away Extra Miss(4D)	£15
Chocks 2 Compendium (4D) **2Mb**	£26
Chopper Force (4D)	£22
Chuck Rock (Krisalis)	£19
Cyber Chess (4D)	**£26**
Cyborg (Alpine)	£19
Cycloids (Software 42)	**£19**
Dreadnoughts (Turcan)	£26
Dungeon (4D)	**£26**
Elite (Hybrid)	£32
Enter the Realm (4D) **2Mb**	£19
E-Type Compendium (4D)	£19
Fervour (Clares)	**£19**
Fred (Software 42)	**£17**
Galactic Dan (4D)	£19
Games Wizard (Leading Edge)	**£26**
GODS (Krisalis)	£19
Gribbly's Day Out (Coin-Age)	£19
Grievous Bodily 'ARM (4D)	£19
Guile (Dream)	£22
Heimdall (Krisalis)	**£22**
Hero Quest (Krisalis)	**£22**
Holed Out Compendium (4D)	£19
Ibix the Viking (Minerva) **(OS2)**	£15
Iron Lord (Cygnus)	£15
Ixion (Software 42)	**£19**
James Pond (Krisalis)	£19
Kerbang (Eterna)	£15
Krisalis Collection	**£22**
-Includes, Mad Professor Mariarty,	
-Pipemania, Terramex & Revelation	
Last Ninja (Superior)	£19
Legend of the Lost Temp **(OS2)**	£19
Lemmings (Krisalis)	£19
Loopz (Audiogenic)	£19
Lotus Turbo Challenge II (Kris)	£19
Mah-Jong Patience (CIS)	£15
Mah-Jong The Game (CIS)	£19
Man United Europe (Krisalis)	£19
Master Break (Superior)	£15
Micro Drive 2 (CIS)	£26
Mig-29 Fulcrum (Domark)	**£25**
Nebulus (Krisalis)	£19
Oh No More Lemmings (Kris)	£15
Omar Sharif's Bridge (Krisalis)	£22
Orion (Minerva)	£15
Pandora's Box (4D) **2Mb**	£19
Paradroid 2000 (Coin-Age)	**£19**
Pesky Muskrats (Coin-Age)	£19
Play It Again Sam1 (Superior)	£19
-Includes Conqueror, Rotor,	
-No Excuses & Hostages	
Populus (Krisalis)	**£22**
Powerband (4D)	£19
Quest for Gold (Krisalis)	£19
Repton 3 (Superior)	£19
Repton 4 (Superior)	£19
Rockfall (Eterna)	£16
Real McCoy 2 (4D) **2Mb**	£26
-Includes Apocalypse, Holed Out,	
-The Olympics & Inertia	
Real McCoy 3 (4D) **2Mb**	£26
-Includes Powerband, Nevryon, Drop	
-Ship & The WIMP Game	
Real McCoy 4 (4D)	**£26**
-Includes Galactic Dan, Grievous	
-Bodily 'ARM, Cataclysm & X-Fire	
Saloon Cars Deluxe (4D)	£26
Saloon Cars Del Extra Courses	£15
Serpents (CIS)	**£15**
Sim City (Krisalis)	**£26**
Spheres of Chaos (Matt Black)	**£19**
Superior Golf (Superior)	£15
Sup Golf Extra Courses (Superior)	£15
SWIV (Krisalis)	£19
Technodream (Superior)	**£19**
ThunderMonk (Minerva)	£15
Tiles (Brain Games)	£15
Top Banana (HEX)	£19
Twin World (Cygnus)	£15
Waterloo (Turcan)	£19
X-FIRE (4D)	£19
Zarch (Superior)	£15
Zool (Gremlin Graphics)	**£22**

2Mb - RAM required for RISCOS3.1
OS2 - Runs on RISCOS2 only
Call for titles not listed

Education

Adv. Playground 5+ (Storm)	£17
Amazing Ollie 4+ (Storm)	£14
Badger Trails (Sherston)	**£30**
Coffee 9+ (Storm)	£28
Concept Designer (Logotron)	£23
Converta-Key	£15
Crossword+ 8+	£19
Crystal Rainforest (Sherston)	**£35**
Data Word (Triple R)	£15
Desktop Folio (ESM)	£89
Farmer Giles 2 (CTS)	£17
FirstLOGO (Longman)	**£22**
First Words & Pictures (Chk)	£26
Flight Path 9+ (Storm)	£28
Freddy Teddy (Topologika)	£19
Freddy Teddy's Adv (Topol.)	£17
Fun & Games 5-9	£18
Fun School 2 (Database)	£15
Fun School 3 (Database)	£18
Fun School 4 (Database)	**£18**
(Please spec. age group <5, 5-7, >7)	
Giant Killer (Topologika)	£17
House of Numbers (Chalk)	£19
Hyperbook Reader (Logotron)	£48
Hyperbook Lib (Logotron)	£110
Junior Database (Iota)	£40
Letters and Pictures (Chalk)	£18
Logo (Logotron)	£60
Magpie (Logotron)	£49
Maps & Landsc. 1/2 (Chk) ea.	£19
Money Matters (Triple R)	£20
Noddy's Playtime (Jmpg Bean)	**£19**
Numbers and Pictures (Chalk)	£18
Numerator (Logotron)	£60
Ollie Octupus Sketch Pad (Storm)	£14
Picture Book (Triple R)	£20
Pin Point Junior (Logotron)	**£23**
Pirate (Chalk)	£18
Prime Art (Minerva)	£69
Puncman 1-2,3-4,5-7 (Chalk) ea.	£18
Reversals (Chalk)	£18
Search & Rescue 9+	£28
Smudge the Spaniel (Storm) 4-8	**£22**
Spellbook 4-9 (Soft Stuff (SS))	£19
Star (Logotron)	£16
Target Maths (Triple R)	£20
10/10 Early Essentials <7yr (3R)	**£19**
10/10 English (3R) 6-16yrs	**£19**
10/10 Maths (3R) 6-16yrs	**£19**
Things to do with No's (SS)	£19
Things to do with Words (SS)	£19
Words and Pictures (Chalk)	£18

Please call for titles not listed

Registered Squirrel Dealer

Desktop Projects Ltd

Please contact us if you are offered a better price elsewhere, we will do our best to match it. We operate the Acorn Teachers Scheme. Special offers do not apply to Finance and Acorn Assist Scheme. This document was produced entirely on the Archimedes using Impression, ArtWorks, Draw & Paint.

Tel: 061-474 0778

Access VISA SWITCH

JUL 93

ARM3 upgrade with floating point accelerator option

The first ARM3 upgrade to allow a floating point accelerator chip to be connected directly to the ARM3's 32-bit coprocessor bus. The 25MHz ARM3 itself increases the speed of your computer by a factor of at least 3, and sometimes even more. In addition the floating point chip speeds up maths operations previously emulated by software.

Other floating point units have the disadvantage of occupying a slot in the backplane. They are also either incompatible with ARM3 boards, or relatively slow due to the 16-bit backplane interface. This upgrade does not suffer from any of these disadvantages.

- ★ **ARM3 alone gives typical 3 to 4 times speed increase**
- ★ **Floating point accelerator chip option for even faster maths functions**
- ★ **High quality 4-layer board**
- ★ **Fits A305, A310, A440, 400/1 series and the A3000**
- ★ **Fully compatible with other upgrades (memory, hard discs, RISC OS 3 etc)**

Installation is straightforward for all machines except the A3000, but a fitting service is available in all cases. Please note also that the A300 series and old A440 require the MEMC1a upgrade. Please write or phone for full details.

Our usual money-back guarantee applies to this product.

25MHz ARM3 - **£165**
MEMC1a - **£25** Floating point unit - **£ TBA**

ARM3+RISC OS 3 - £199

A3000 memory

An easy to fit and reliable RAM upgrade. 8-chip design for minimal power consumption. **Gold plated** connectors ensure long term reliability. No soldering needed.

2Mb RAM board (upgradable to 4Mb) - **£43**
4Mb RAM - **£107**
Bare board (without RAM chips) - **£25**

A3010/A3020/A4000 RAM

These machines may all be upgraded by easy to fit, plug-in components. No soldering is required.

A3020/A4000 extra 2Mb - **£55**
A3010 extra 1Mb (2Mb total) - **£29**
A3010 upgrade to 4Mb - **£107**

All products fully guaranteed. Many products also carry our 14-day money-back guarantee too. Please phone for details.

ARM3+RISC OS 3 combined package for £199

RISC OS 3

Acorn's new operating system for their range of RISC computers. The old version of RISC OS (2.00) is just 512K long, whereas OS 3 contains 2Mb of code.

Many applications which were previously supplied on disc are now contained in the OS ROMs. This includes improved versions of Draw, Paint and Edit. Because they are available on ROM they are always instantly accessible, and also occupy less RAM space.

Other features include extra "background" operations. For example, discs can now be formatted or files copied while the machine is used for other purposes.

RISC OS 3 may be used on the A305, A310, A440, 400/1 series, A3000, A540 etc.

RISC OS 3 £41.70

A305, A310 and A440 owners please note. Although the ROM sockets inside your machine are large enough to accommodate the new ROMs, simply plugging in RISC OS 3 *will not work.* This problem is overcome by installing the RISC OS Carrier Board first. The RCB may be used with any version of RISC OS. This carrier board is compatible with memory boards, ARM3 upgrades and does not in any way obstruct expansion cards ("podules").

RISC OS Carrier Board £18

A5000 systems & memory

A5000 with RISC OS 3, 80Mb hard disc, multisync monitor and ARM3. - **£1399.**
A5000 learning curve. - **£1445.**
Free 4Mb RAM upgrade included in the price.

2Mb memory board (4Mb total) - **£75**
A compact board measuring just 104mm by 49mm, this design fits vertically in your machine. No soldering required. Unlike larger boards, there is no need to remove the disc drive. Four-layer design as specified by Acorn. A bare board (ie without the RAM chips fitted) is also available.

Hard disc upgrades

A range of fast SCSI or IDE internal hard discs with a year's warranty, in sizes from 40Mb upwards. Supplied with all metalwork and cables. 400/1 machines merely require the drive and controller card. 300 series require a backplane.

40Mb SCSI - **£180** 85Mb SCSI - **£210**
120Mb SCSI - **£250** 210Mb SCSI - **£320**
Fast 16 bit SCSI card - **£100**
50Mb IDE - **£160** 120Mb IDE - **£250**
IDE controller card - **£75**
(add £75 for external version of SCSI discs)

Various

Aleph One 386 1Mb PC Card - **£390 (4Mb £475)**
Aleph One 486 1Mb PC Card - **£490 (4Mb £575)**
Impression 2 - **£130**

Free price list available upon request.
Prices exclude VAT.

A310 & A305 upgrade column

Memory expansion

Extra memory is without doubt the most worthwhile addition to any A300 series machine. Some programs won't even run with only 1Mb, and 2Mb is a bare minimum. Certain applications, desktop publishing for example, benefit from a 4Mb system.

2Mb - £89 4Mb - £128

Compatibility. The memory is detected and used by the machine automatically, so there are no special commands needed. Works with both RISC OS 2 and RISC OS 3.

The use of only eight RAM chips ensures low power consumption. Compatible with ARM3 upgrades, backplanes, hard discs etc. This upgrade is supplied on just one, compact board measuring only 195mm by 40mm. Four-layer circuitry reduces electrical noise for trouble-free operation. The 2Mb upgrade may be upgraded to 4Mb later by the user, without any soldering. A copy of the fitting instructions is available free of charge.

A complete fitting service is available for our RAM boards covering courier collection, installation and testing, MEMC1a, return delivery and guarantee. This is normally a three-day service (eg, collected Monday, returned Wednesday). We have been upgrading 300 series computers for over three years, and during that time a reliability record second-to-none has been established.

Is there any other 300 series RAM upgrade wich has been available for as long as this one, and which has the same reputation for quality and reliability? No.

Still not sure? Compare it with the competition before making up your mind. Use our 14-day money-back guarantee to check it out for yourself.

RISC OS Carrier Board £18
This is an easy to install adaptor board for the larger RISC OS 3 ROMs. A set of links on the board allows it to be used with RISC OS 2 and easily adapted for RISC OS 3 later. Suitable for use with the A305, A310 and A440. The adaptor has been fully tested with RISC OS version 2 and version 3. It is fully compatible with other hardware upgrades such as the RAM board described above, ARM3's, backplanes, VIDC enhancers and expansion cards.

Note: Early versions of certain 300 series RAM upgrades from other suppliers do not work properly at first with RISC OS 3. The problem can be completely overcome simply by changing a chip on the RAM board. IFEL can supply a replacement chip for only **£3.** Please ring for further details.

4-slot backplane with fan £52

Combination deals

4Mb with MEMC1a, self-fit **£152**
Collection of your computer, installation of 4Mb of RAM, MEMC1a, and RISC OS Carrier Board, testing, full guarantee, and return delivery **£189**
As above, but with 2Mb of RAM **£125**
(Add £40 to have RISC OS 3 fitted at the same time.)

Special prices available on hard discs, ARM3 boards and software when ordered with any memory upgrade. (RISC OS 3+ARM3 for only £199)

RAM for 410 & 420

Upgrade from 1Mb to 2Mb - **£33**
Upgrade from 2Mb to 4Mb - **£65**
Upgrade from 1Mb to 4Mb - **£98**
Supplied with full instructions.

VISA

IFEL Ltd **Educational and quantity discount available.**

34 Culver Road, Saltash, Cornwall PL12 4DR. Tel (0752) 847286. Fax (0752) 840029

IN BRIEF

A Basic compactor, a font filing system, a way of using your Arc for embroidery and a monochrome video digitiser

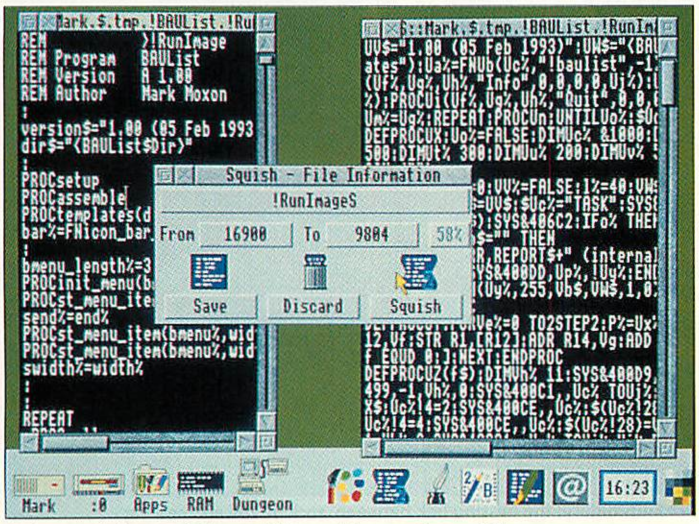
SQUISH

Supplier: Unique Software
Address: 66 Eton Avenue, East Barnet, Herts EN4 8TY
Price: £10

The idea of compacting Basic programs has been around some time. Compacted programs take less memory, and execute faster.

Using *Squish* is simplicity itself. To squash a program, you drag it to the iconbar, click on the Squish button, and save your compacted program.

Squish applies compacting algorithms to your program: removes REMs and LETs; removes spaces; renames variables, procedures and functions; reduces SYS calls and concatenates lines. You choose which to apply to your program, though in most cases you would want all used.



Before and after squishing: which would you rather edit?

In the case of renaming variables, procedures and functions, you choose which you wish to rename, renaming variables and leaving procedure names intact, letting library programs be squashed. You also choose specific identifiers which should not be renamed by putting a statement like:

```
REM LOCK PROCinit, block%,
file$
```

to avoid changing references to named routines or variables.

There are rules programs must obey to work after being compacted. There must be no GOTOs or GOSUBs in the program if the concatenate lines option is used, as *Squish* ignores these. Turning off concatenation solves this problem. It's not a problem with well-written programs, but what happens if you want to squash all those programs you wrote before realising line numbers were a waste of time?

Squish is quick and efficient. I took a typical program, squashed it with all options on, and the result was 58 per cent the size. This let me reduce the Wimp slot from 64K to 32K. Well worth a tenner, and I don't know of another squasher which beats it on speed and features.

Mark Moxon

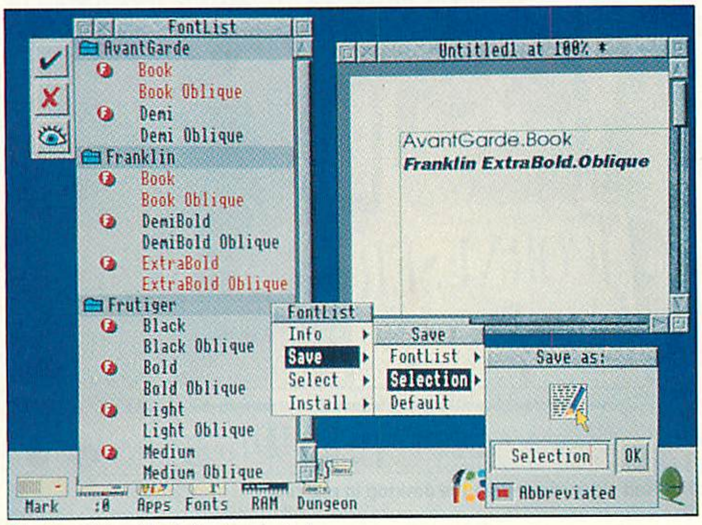
FONT DIRECTORY

Supplier: LOOKsystems
Tel: (0603) 764114
Price: single copy £35; site licence £150; network version £250

Font directories can be a pain, especially if you've a huge collection of fonts. Having 250 fonts on your system is not unlikely, especially as *ArtWorks* provides over 200. But this can cause problems from unwieldy font menus to crashing applications. For instance, Acorn's latest blockbuster, *Advance*, crashes if you have more than 64 fonts installed. The entertainingly-titled *Font Directory* could save the day.

Font Directory is two applications: *FontDir* and *FontMgr*. You use *FontMgr* to create special font directories, which you then control with *FontDir*.

Conceptually, font directories created by *FontMgr* are identical to normal font directories: they contain font definitions, and when you run them, the fonts are available to any application. *FontMgr* directories are different in structure, as they store the fonts in special font partitions, which are accessed by *FontDir*. Creating directories using *FontMgr* is simple: you decide how big you want your partition to be, copy fonts into the filing system, and the application sets up the directory.



The FontList with six fonts selected

FontDir installs an icon on the right of the iconbar to represent the font filing system, and it is from this icon that you control your font partitions, plus any conventional font directories you have.

FontDir's power is in its handling of the special font directories created by *FontMgr*. Fonts in the directories are shown in a window by font and weight. Fonts can be selected in a similar way to files in directory windows, and icons allow whole fonts, or similar weights, to be selected. A useful feature is that dragging, say, an *Impression* file into the window selects fonts used in that file, so you limit fonts to those used. Selected fonts can be installed, most applications then update their font menus.

The version I looked at was very nearly complete, and LOOKsystems hopes to release the finished product by July.

Mark Moxon

ARC EMBROIDERY

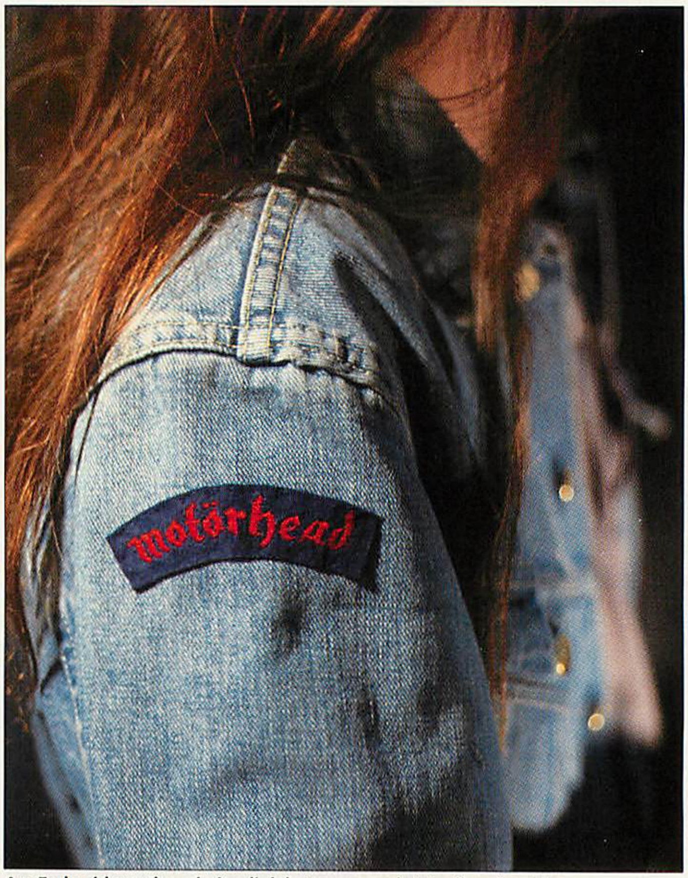
Supplier: TechSoft
Telephone: (08243) 318
Price: £699 for full system; £75 software only

TechSoft's *Arc Embroidery* consists of the embroidery machine itself (not manufactured by TechSoft), its assorted accessories and a serial lead. This plugs into the RS423 port of any Archimedes.

The software that drives the machine is fully Wimp-based and only hogs the whole machine during the stitching.

In reality, all you have to do is drop a *Draw* file or sprite file onto the icon, scale it if necessary and, at the simplest level, click on Output; nothing could be easier.

The machines cannot sew sprites as they are, so the sprite is automatically converted into outlines before stitching. *Draw* files pass through untouched and the software will reproduce lines (dotted and plain), curves, filled areas and even text (under Risc OS 3). Everything, in fact, except text areas.



Arc Embroidery: the missing link between rock 'n' roll and sewing

Objects within a file are sewn in order (the ones at the back first) so care must be taken when overlapping shapes. On screen, the finished image appears clean because top layers overwrite those underneath. On cloth, each shape is sewn in full and overlapped areas may appear messy. This can be overcome by grabbing the draw output as a sprite, then sewing this.

The machine can only handle one colour at once, but prompts when to change threads. In fact, the colours in the image do more than specify the thread colour. The machine can handle a number of types of stitch such as Mesh, Satin and Zigzag, a wide range of stitch lengths, pattern lengths and filling densities. Each colour in the image can be assigned any combination of the above, giving a huge variety of output. Areas can even be padded.

In operation, the machine ran with surprisingly few hiccups. It occasionally managed to do nothing except break its thread, but this was usually when embroidering particularly complex patterns. It can handle material up to sweatshirt thickness. I tried a teeshirt but it was a nasty cheap one and the machine almost shredded it; so watch out.

Level 8 of Key Stage 4 of Technology in the National Curriculum says: 'pupils should recognise that information technology can assist the manufacturing process,' and it could be useful in schools. I suspect £699 may put it out of reach of home users, though clubs or businesses could use it to create staff or member name tags or logo shirts.

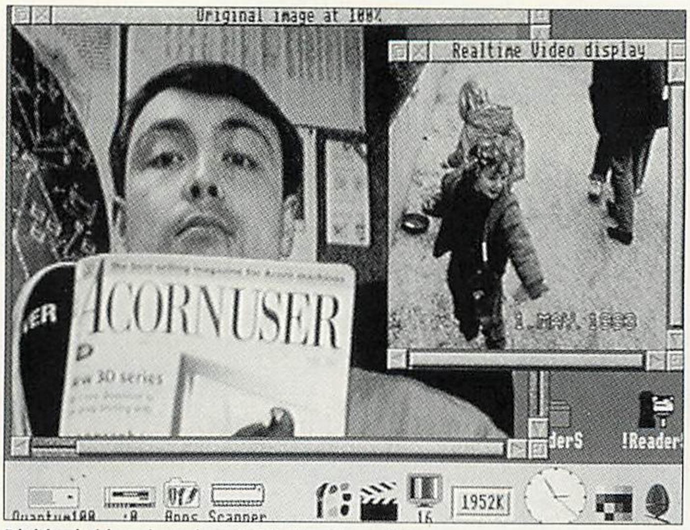
Dave Lawrence

GREYHAWK

Supplier: Wild Vision
Tel: (091) 519 1455
Price: £99+P&P+VAT

Wild Vision's new monochrome video digitiser isn't the first of its kind for Archimedes users. So what makes *Greyhawk* special?

Wild Vision is best known for its excellent *Hawk V9* colour video digitiser. *GreyHawk* is a cheaper, black-and-white version. Like the *V9 MkII*, Wild Vision's high quality hardware is mated to one of the best Archimedes image processing applications – Computer Concepts' *ScanLight Plus*. This is no surprise as CC and Wild Vision joined forces last year and *GreyHawk*'s real-time display and frame-grabbing application, *TakeOne*, was also developed by CC.



Digitised video viewed on the desktop in real time

After the podule card has been fitted, the composite video output of your video recorder or camcorder needs to be plugged into the podule's BNC connector. There are two applications: *ScanLight Plus* and *TakeOne*, which communicates with the card.

TakeOne's icon is a clapperboard. Set the video to Play, click on the clapperboard and a Risc OS window displays video playback on-screen.

This comes set with a 72 x 36dpi resolution driver specifically for *GreyHawk*. To grab a frame, click on OK from the Scan dialogue box while monitoring the *TakeOne* real-time playback window. All of *ScanLight*'s numerous image-massaging options are available and grabbed frames can be saved as *Draw* files or sprite files.

CC and Wild Vision have exploited the reprogrammable Xilinx chip which means different scanning resolutions and aspect ratios will be available in future as software upgrades. Grabbed images are currently 256 x 512 pixels, but a higher resolution 512 x 512 option is on the way.

The card has a 256K frame store so high-resolution frame grabs can be made while viewing playback at up to 25 frames per second, depending on screen mode and specifications of the Archimedes. Newer Arcs with faster 12MHz internal buses run better than 8MHz machines. An eight-bit A3000/A4000 card is coming as is a video sequence record-to-disc application.

If you are want a high quality mono video digitiser, *GreyHawk* must be worth serious consideration.

Ian Burley

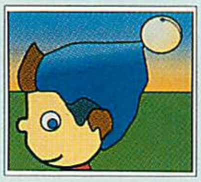
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DISC CONTENTS: JULY 93

REGULARS

Squashed onto the subscriber's disc are all the programs from the yellow pages, including *INFO, part two of our 3D graphics construction kit, and the ultimate screen mode changer, *UltiMode*. There's also the easy-to-use *Acorn User* menu system and three bonus items.



NODDY DEMO

Noddy's Playtime is a new educational program from The Jumping Bean Company, based on solid educational principles for three to seven year-olds. This preview is a fully-functional demonstration of three of the ten programs which make up this amazing package. In Noddy's car you can drive around Toytown, at Noah's Ark you have to assemble jigsaws, and Noddy's Paint Pot is a complete junior art package. Guaranteed enjoyment for kids and adults alike.



ADVENTURE FRONT END

Infocom has released twenty of its best text adventures in one big pack called *The Lost Treasures of Infocom* (see review on page 78). Although the package is for PCs, you can play the lost adventures in a window on your desktop using this front end. Remember *Zork*, *The Hitchhiker's Guide to the Galaxy*, *Suspended* and *Planetfall*? Now you can play them all on your Arc.



VILLAGE DEMO

A visit to Silicon Village is a mind-bending experience at the best of times, and this demo of the Viewdata-based village is no exception. Thrill at the towering Leisure Centre; feel the excitement of the Village Church; relax over a virtual pint at The Dog and Bone; it's all here along with *Hearsay* and *ArcComm* scripts to help you connect.

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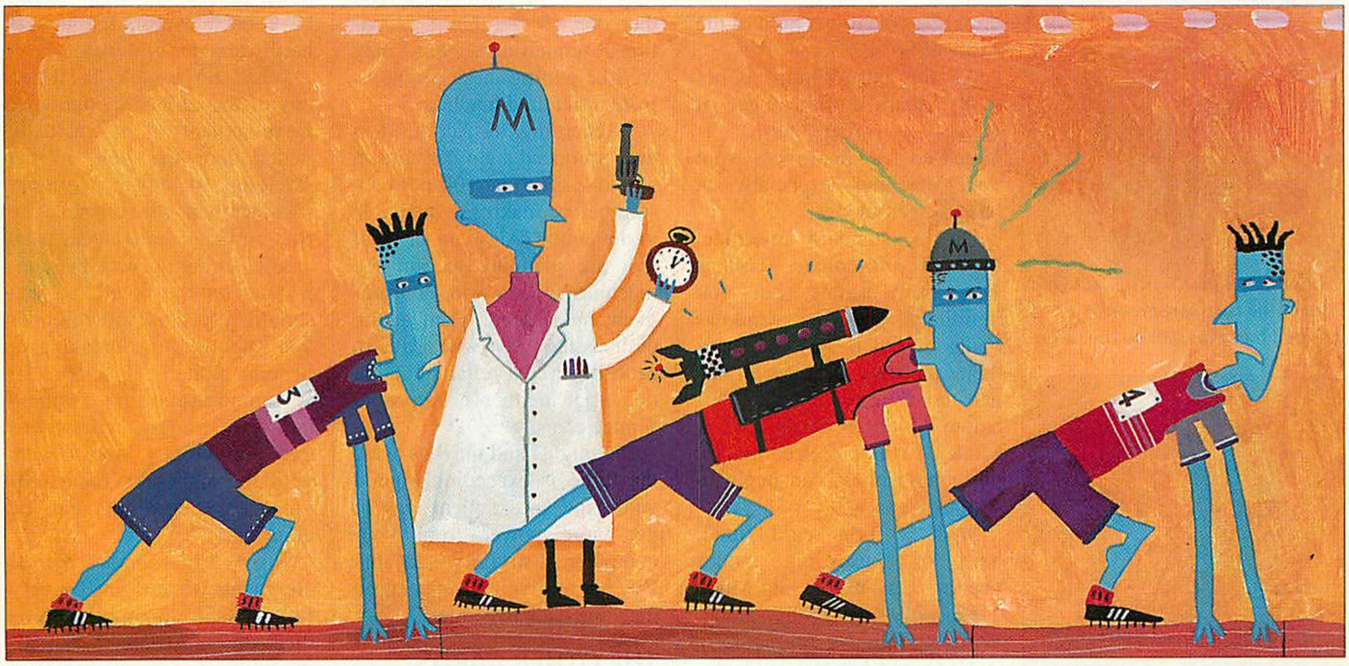
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SPIKE GERRALL

Ahead of the pack

One Ram upgrade for your A3010 is much like another. But, as Dave Lawrence relates, in our comparison of upgrade boards, Simtec had something extra

You shouldn't need me to tell you why you might want to add more memory to your machine. With desktop applications growing in complexity and size, 1Mb often isn't enough even to load a program let alone to start using it.

The next obvious step would be to double your Ram to 2Mb, but even then you may find yourself running short of bits and bytes.

4Mb is now really becoming commonplace in Acorn machines so if you are considering an upgrade for your A3010, I would say that the step to 4Mb is really the most sensible route to take.

If you take a quick look at the task manager display on a standard 1Mb A3010, you'll find that out of your initial 1024K, quite a hefty chunk has been allocated to system functions and you're actually left with only about 600K for applications. On a 4Mb machine this 400K system space has much less of an impact on your 4096K, so upgrading to 4Mb effectively increases your available memory by a factor of six.

Of course, it is unlikely that you'll leave the machine configured in this way; the immediate things I do on upgrading a machine are to allocate at least 256K to the font cache to speed up the font manager, and create a Ram disc for temporary files. This is a particular boon on a floppy-only machine.

SIMTEC TURBO CARD

We had boards from five manufacturers, all of which do the same thing, but the most interesting was the Simtec turbo card. This not only ups your memory, but also the speed of the machine.

The A3010 was designed with the capacity to run at 16MHz, but Acorn has not yet made use of this. It has been left to third parties, like Simtec, to exploit it. Simtec uses special fast DRams and a new crystal needs adding to the main circuit board.

For this, your machine needs to be sent to Simtec or another Approved Surface Mount centre. According to a speed test program, my standard A3010 runs at a little over 7mips. With the turbo upgrade this increased to just over 10mips: an improvement of 40 per cent.

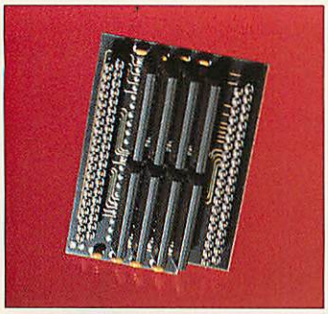
Simtec supplied me with a one-off machine fitted with a super turbo that put in an exceedingly respectable 12.25mips, which is even more amazing when you think that a 25MHz Arm3 (as in an A5000) produces 'only' 13.5mips.

The 10mip version of the turbo card will be the one generally supplied, but, according to availability of components

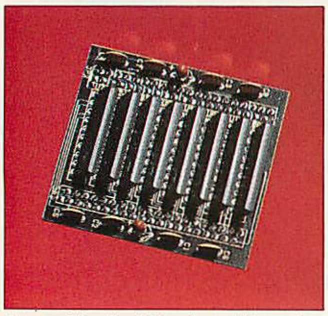
How is it done?

The super turbo consists of a standard 4Mb board, identical to the standard Simtec one except it is populated with 45ns DRam rather than 70ns. This allows the Ram to be clocked at a much faster speed and needs an extra crystal fitted to the main circuit board to supply the necessary clock signal. In this case a 20MHz signal is used (which gives a memory access time of 50ns, hence the 45ns DRams); the standard turbo uses a more conventional 16MHz signal.

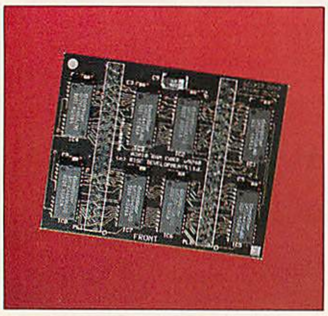
The A3010 does not have exactly the right connection for this crystal, so it is mounted on a mini-pcb which fits on to the test connector just to the left of the Rom chips. This board is connected via a flying lead to the Arm250. One other component – a resistor – is all that is needed. The important thing in this upgrade is to use the right crystal, selecting one that gives exactly the right-shaped clock wave.



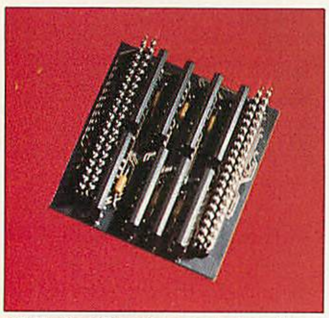
Simtec : the company provides a standard model as well as the turbo



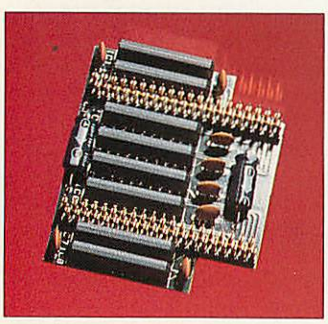
Atomwide: the DRam is positioned on top of the board



Risc Developments: the only card to use surface-mounted components



HCCS: the DRam is mounted on the underside of the card



ROBERT CLIFFORD

IFEL: this card was the cheapest in our test

(and if you ask nicely) you might be able to get hold of the super turbo.

All this talk of mips is not really that useful; what it means in real terms is increased responsiveness from your machine, especially in large screen modes.

On a standard machine, Mode 27 (16-colour VGA) is just about usable, but you definitely notice windows being redrawn as you drag them about the desktop. In larger modes, such as the 256-colour Mode 28, or the SVGA Mode 31 (my preferred mode), this sluggishness can begin to seriously annoy.

With a turbo card fitted, both of these big modes become very usable and Mode 27 positively bombs along. Window redraws (particularly in *Draw* and *Impression*) benefit greatly from the extra speed, and it is now possible to run *Replay* files in Mode 28. These are only a couple of examples, but the benefits of faster machines should be obvious, anyway.

Of course, you can't expect to improve something so dramatically without a downside. The power consumption is increased by about 20mA and the temperature inside the case rises.

Obviously, the actual rise varies according to where you measure but after leaving a probe between the Ram chips running a continual memory test for 48 hours, the temperature read 65°C; in comparison, a standard 4Mb card runs at 55°C. Whether this rise will actually contribute to any problems is very hard to say.

My test consisted of running the machine on a carpet and covering it with books – not very scientific admittedly, but probably where quite a lot of machines find themselves. In a room in direct sunlight during the summer in Australia you might get quite different results, but as far as I can tell the machine seemed to run without errors.

If errors do occur they appear to be random: unconnected Aborts or Address Exceptions which would be quite hard to track down to the Ram card. The part of the computer most sensitive to heat is the floppy drive, so disc errors may also start to occur. But then don't forget that in exceptional conditions, you may well be getting these problems from a standard machine.

According to Acorn, if it ever produced a similar card, it would want to be 100 per cent sure before making it available to the public. All I can say is if you are planning to run the machine in a warm environment, be warned. Then again, perhaps the turbo will prove to be 100 per cent reliable, and at this stage neither I, Acorn or Simtec can say.

Ifs, mights and maybes aside the turbo is exceedingly good value and an excellent way to get more power from your computer. I'm only sad that I've got to give the super turbo machine back to Simtec.

THE OTHER CARDS

The other four cards we tested were standard 4Mb boards, from Atomwide, Risc Developments, HCCS and IFEL. Simtec also does a standard card. All can be easily user-fitted. This involves unscrewing the case (three screws only) and lifting up the keyboard. Some manufacturers recommend you unplug the two ribbon cables, but I find these particularly fiddly to put back. The best way I found was simply to prop the keyboard up with a screwdriver, car bonnet style.

Obviously, if you've previously upgraded to 2Mb, the upgrade must be removed first. The 4Mb board then simply plugs into the memory expansion socket beneath the numeric keypad in a hole in the metal shielding. Two links have to be changed – you'll need a pair of pliers – but that's all there is to it; definitely one of the easiest memory upgrades to fit. In fact, the only things you could do wrong are to zap them with static (just touch something earthed before you handle the cards) or to plug them in back to front.

Risc Developments and IFEL both have 'Front' written on the card, HCCS has a piece of foam insulator, Simtec has a notch for the speaker connector and Atomwide chips should have their labels facing forwards. Although tricky to get these last three wrong, some more precise labelling would have been useful, but this is hardly a major criticism.

I had no trouble in fitting any of the cards although Risc Developments' is actually wider than the hole in the shielding, making it just a tad trickier than the others. The two rows of pins then need careful lining up with the connectors on the board, so you should pay close attention or you might end up breaking or bending a pin.

A good firm push is required and I'd strongly recommend that you protect your fingers with the anti-static foam provided, as these pins can be quite sharp.

Apart from these general comments, there is really very little to say about the boards themselves. All are high quality with good connectors and four layer construction with solid ground planes. The HCCS, IFEL and Simtec designs mount the DRam under the card, Atomwide and Risc Developments on the top. Only Risc Developments uses surface mount components, the others use SIMs; this is why its board is larger than the others.

As with all Ram products these days there is nothing much to choose between them. IFEL's is the cheapest at £107 + VAT, but quite honestly at £129 for the Simtec Turbo you can't really do much better.

Product details

Product: 4Mb Ram upgrades for the A3010

Supplier: Atomwide
Tel: (0689) 838852
Price: £149 + VAT

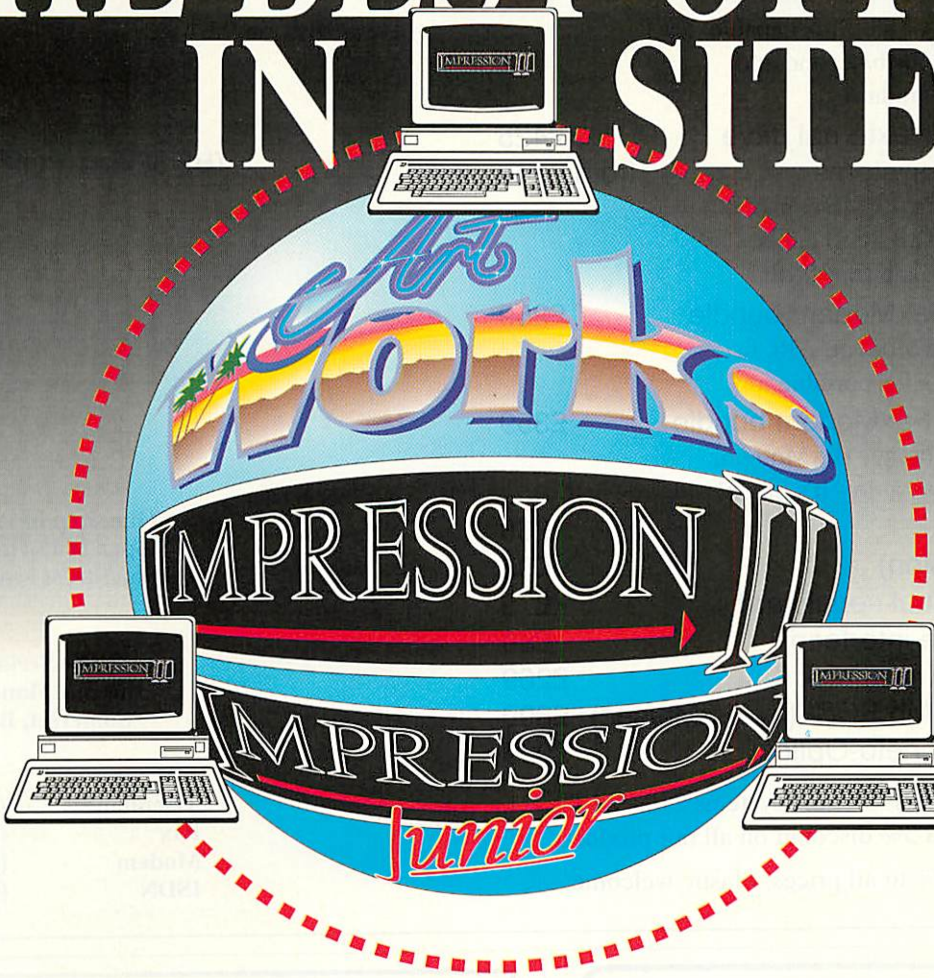
Supplier: Risc Developments
Tel: (0727) 840303
Price: £129 + VAT

Supplier: HCCS
Tel: 091-487 0760
Price: £126.81 + VAT

Supplier: IFEL
Tel: (0752) 847286
Price: £107 + VAT

Supplier: Simtec
Tel: (0772) 812863
Price: standard Ram upgrade £108; 10mip Turbo, £129 (both exc VAT)

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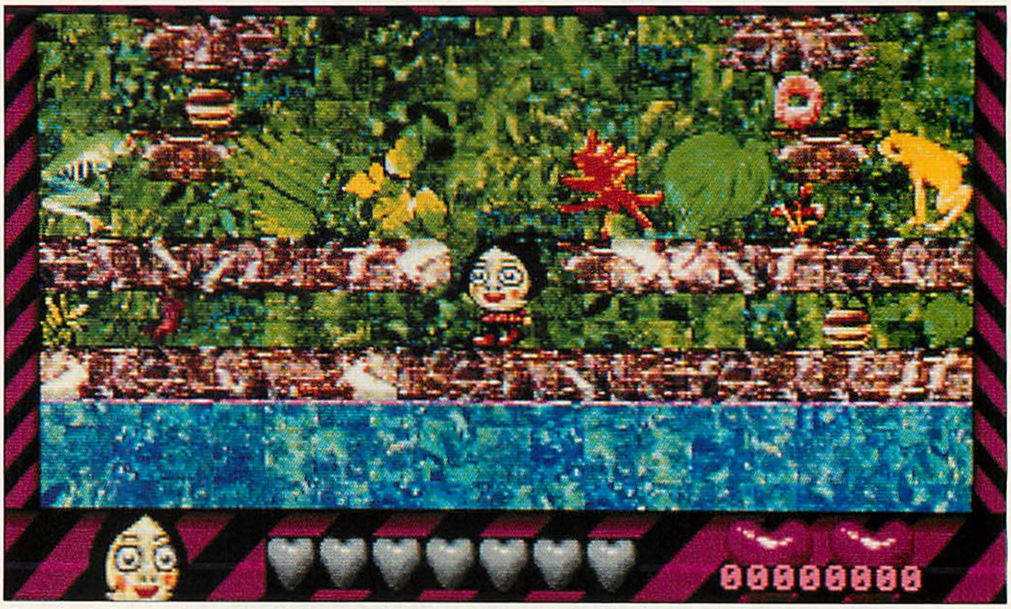
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GAME SHOW



Superior Software's Play It Again Sam compilations will give you another bite at classics like Top Banana

'The future is here!' proclaimed an article in last December's games supplement. Unfortunately it wasn't, as a few readers, tutting 'promises, promises', have written in to say. The article was speculating about juicy conversions of the best games from the 16-bit world, but so far nothing has come. Now, however, impatient gamesters wake up. *Speedball 2* and *Powermonger* are just around the corner.

In July, Krisalis Software will be releasing one of these blockbuster titles, probably *Speedball 2*, and for anyone who hasn't played it on a 16-bit machine, believe me when I say you will be hooked in an instant. That is, if you're the sort of person who thinks it's okay to foul at football, cheat at hockey and get violent in a big way playing rugby.

That's because *Speedball 2* is an amalgam of all these sports and includes the worst foulers you could find in any of them. It is set in a metallic arena, viewed from above, and the grand plan is to run around with the ball, heavily clad in metal body armour, and score goals. Doesn't matter how. But *Speedball 2* is also about management.

You train your team members individually and each one has his own mug shot and vital statistics. Send some tough guys to work out on their biceps and they can be centre forwards; the fellas in defence can train in front of the mirror – they just have to look mean.

If *Speedball 2* is the next release from Krisalis, *Powermonger* will definitely be the one after that.

Meanwhile, Superior Software is busy putting together a new compilation disc for people who missed the first release of some popular 32-bit games. *Play It Again Sam 2* will contain the first ever 32-bit game, the space hovership shoot-em-up *Zarch*, the puzzle game *Repton*, the convincing *Arc Pinball* and the snooker quiz game *Master Break*. All four games, for the price of one, will be on the streets shortly.

The compilation after that – *Play It Again Sam 3* – will contain a collection of games voted for by readers of *Acorn User*. Some of the games Superior Software is considering include *Ballarena*, *Bug Hunter in Space*, *Twin World*, *Top Banana*, *Tower of Babel* and *Superior Golf*.

For BBC Micro owners *Play It Again Sam 18* will be released soon. It will contain the golf game *Holed Out*, the racing game *E-Type*, the space shoot-em-up *Nevryon* and a new version of a very old game: *Citadel 2*.

BUDGET BUYS

From Matt Black Software we are awaiting two budget games, both selling for £9.99. The first is a re-release of the alien-blasting, two-player, horizontally-scrolling annihilation game *Aggressor*. Matt Black says the graphics have been improved to include terrifying creatures from films such as *Terminator*, *Aliens* and *Predator*.

The other game is a martial arts beat-em-up called *Blood Sport*. It can be one or two player and is a tournament against the world's finest fighting champions, each of whom has his own fighting technique and special power.

These budget titles will be available by the time you read this. Happy gaming.

EGO RESULTS

The winners of the Ego competition from the February issue are: Felix Pigg from Birmingham; W Thompson from Sandy; Simon and Chris Bullock from Wem; Jessica Hepburn from Hampstead in London; and D Herbert from Workington in Cumbria.

They each win a copy of the *Repton* puzzle game from Superior Software. The correct answers were: the face in the picture was Napoleon (*not* Wellington); the town Repton is in Derbyshire; and the issue in which *Repton* was first reviewed was July 85.

Cheats



Spheres of Chaos, from Matt Black Software, the fireworks game with exploding asteroids, has a built-in cheat. It's not exactly obvious how to get it: go to the main menu and point to the lives number in the top left of the screen and click the left mouse button 50 times. When you play the game, each press of the Delete key will grant you an extra life. Thanks to Julie King of Leeds for this one.



Technodream the most recent shoot-everything-without-exception from Superior Software is a lot easier with extra speed, a ram and a couple of missile launchers, which cannot be lost. Oh, and an extra life. How? Richard Brown from Coventry wrote to tell us: choose to be the blue pilot then hold down the space bar until the game starts. Simple or what?

AXIS

Supplier: TBA Software
Tel: (0970) 626785
Machine: 32-bit (with built-in Arm3 version)
Price: £24.99



Axis, where, for a change, the world revolves around you

This game scored a big hit with the illustrious Dominik Diamond at the Harrogate show, and with good reason. If someone told you there was a tank game in which, whenever you rotated, the rest of the universe turned, you'd say: 'naa, only in the arcades.' But this is a game where the world revolves around you for a change.

All the scenery graphics literally spin around in real time as you move. This is rather unsettling at first, but once you're comfortable with your chosen controls, it seems very natural. It actually adds another dimension of realism, since most overhead tank games tend only to have translational movement. Your brain is forced to take the pictures on the screen seriously.

You control a mean piece of hardware called the Rogue, in which you must penetrate an alien base and work your way down through eight enormous levels, to the core field generator. Level one is made up of the wasteland surrounding the entrance to the base, to give you a chance to get used to the game without being attacked from all sides.

It's best to start with a simple forward/backward, rotate clockwise/anticlockwise control system, and then, as the disorientation wears off, move on to *Conqueror*-type keys with control over each caterpillar track.



Things get much harder as you go along, and you need to adapt your playing style, and really improve at each step in order to earn the password for the next level. It's not easy; the aliens are as keen to keep you out as you are to get in, and they send in all sorts of horribly beweaponed machines to shoot at you, pin you against the wall and generally get up your nose.

There are swivelling gun turrets of various kinds, electric-field generators, and hidden pressure pads in the floor which can trigger off any or all of these nasties. Some of the tanks fire guided bullets or turn invisible, on top of which they are all intelligent (controlled by hoopy heuristic algorithms) and won't leave you alone if you try to run away. The final objective on each level is to get the better of an enormous turret which tracks you and fires over a very large range.

The trick is to find the approach with the best cover and then sneak out and hit it with all you've got (not to be sniffed at). You have a cannon with variable rates of fire and bullet strength, mines, and up to eight orbitals which circle you quietly until you trigger them, whereon they fly out and ruin the day of any nearby aliens. Some dead aliens release powerups to restore your strength (you only have one life) or soup-up your weapons.

Each level has its own graphical theme, with some continuity from the last one, and there's plenty of destructible scenery lying around which gives you something to blow up in those moments when nothing else will do. Flashing arrows are thoughtfully strewn on the floor in places to give you some idea where to head – there isn't a map or compass, but there are one or two clever ways to keep track of where you've been and where you're going.

The backgrounds are a bit on the chunky side (to speed up rotation) but curiously this only seems to add to their appeal. Top marks to graphic designer Matt Dulson for some superb draughtsmanship: for example, everything is fully shadowed with respect to a light source.

The rotation effect has caused something of a stir. For a start, when you first see it (especially on an Arm 3 machine, where the graphics are at double resolution, with fewer jagged diagonals) it looks completely impossible. Anyone who's tried to achieve something similar will tell you about the horrendous amount of maths involved. What's more, this routine is so accurate that you never see a hole in the graphics left by an errant pixel.

In fact, the programmer tells me it's just a clever mathematical shortcut. It's also a closely-guarded secret. Apparently they have a similar routine in the bag which can do all this at the same time as displaying the graphics in a perspective projection. This will mean console-style car games with realistic 3D on the Arc.

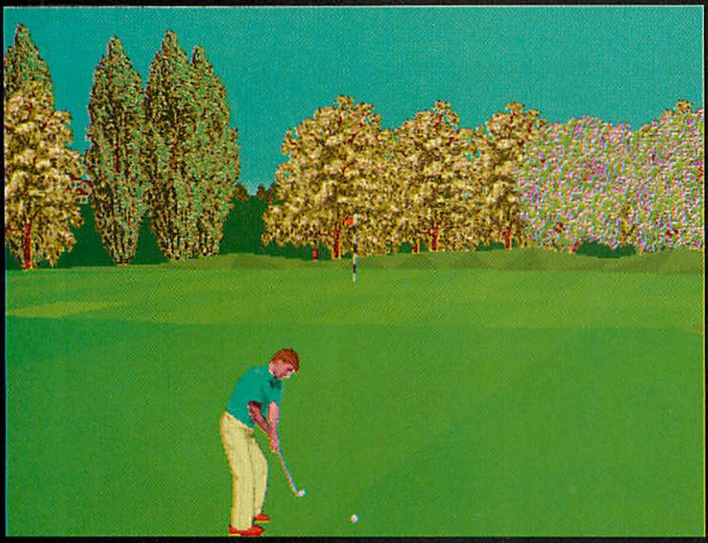
With ever-increasing computing power and stunning visual effects, creativity in games is usually the first casualty. Happily, this one is different. My only quibble is that apart from switching fields and beams on and off, there are no logical puzzles.

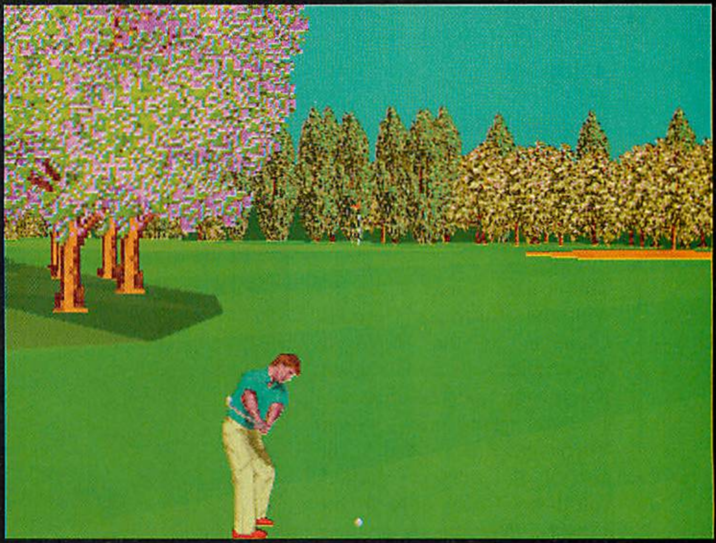
Also, it might have been nice to use the toothed cargo doors as part of an elevator system, to show off the end of level zooming effect more often. There is definitely scope here for an *Axis-2*, but for now be content with what has to be one of the best games out for the Arc.

Matt Tizard

Virtual Golf

'It's almost worth selling your clubs to buy it!'









No more power meters – you control your swing by moving the mouse.

Virtual Golf is not like any golf game you have ever played. Your shot is controlled by the movement of the mouse giving a degree of direct control and 'feel' that is unparalleled.

Power is gained by a smooth backswing and a good follow through but chip shots will require all the delicate skill and judgement that you need on the course. Hooking and slicing come into play by opening and closing the face of the club (mouse) and also by a bad swing.

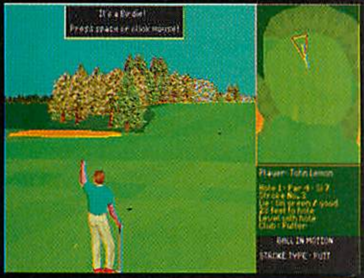
As with the real thing your primary objective is to improve your handicap which starts at 28. When you are ready you can play assessment rounds (which can take you up as well as down) and as you progress you will gain the opportunity to enter the 6 increasingly competitive tournaments that are included.

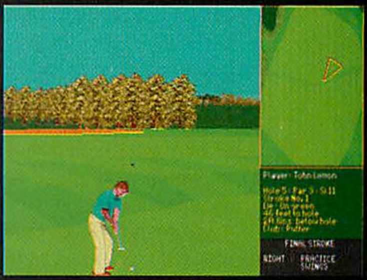
The course (which consists of over 1 Megabyte of data) is based on Wentworth and includes hills, ditches, digitised trees, bunkers and paths to create an unsurpassed illusion of reality. The greens are varied and undulating to add to the challenge that putting demands on real greens and the ball convincingly responds to the slightest changes in the slopes.

In Virtual Golf, the author Gordon Key has produced a simulation that anyone can play and enjoy yet will challenge and satisfy even the most ardent golf fan.

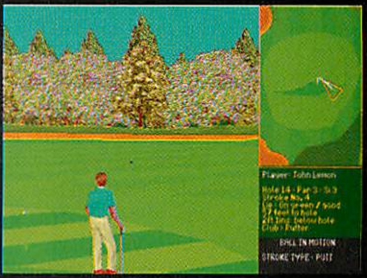
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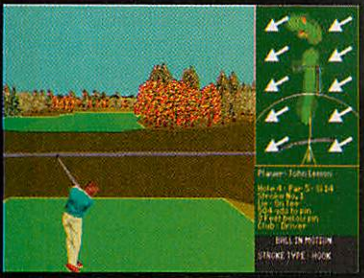
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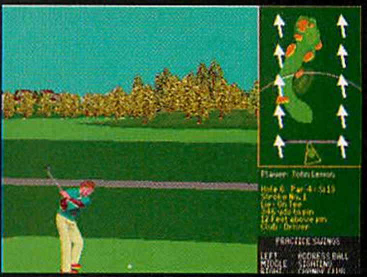








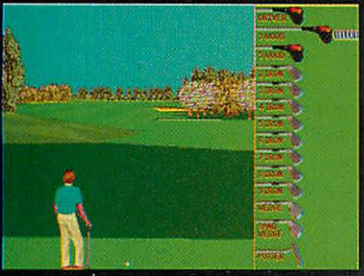




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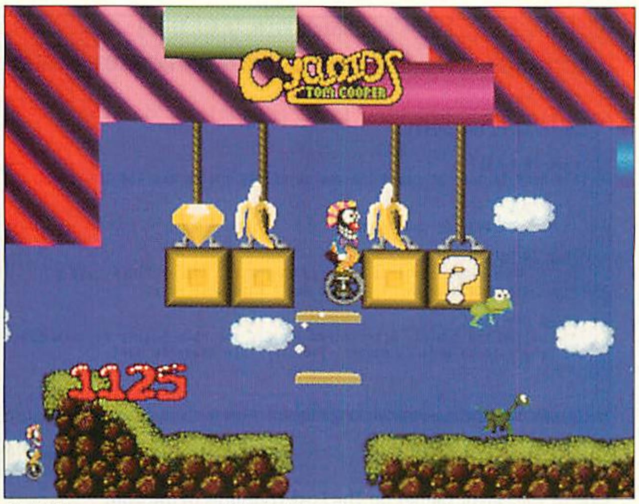
CYCLOIDS

Supplier: Software 42
Address: 109 Ferry Road, Hullbridge, Essex
Machine: 32-bit (with built-in Arm3 version)
Price: £25

By their very nature, heroes are not your normal kind of guy, yet it is not uncommon to spot them with equipment as basic as a laser gun and a pair of legs as they embark on mission impossible – the scenario of so many games. In *Cycloids*, however, somebody went out of their way to avoid the norm altogether.

The job of saviour of the world falls on an amiable children's entertainer. He is a circus clown and he rides a unicycle. And he is a clown with a cause...

From a far off planet, the balloons are invading. Yes, that's right, the enemy is an army of air-filled balloons and they need to be popped before their evil intentions are fulfilled, for the inflatable nasties have come to take over the planet by gradually turning living things into cartoon-like creatures.



Cycloids: not your normal kind of tough guy adventure game

And so it is that an otherwise unlikely scenario is explained. There you find yourself, wearing a silly, bright get-up, perched on a unicycle and wobbling round desperately trying to steer clear of pink flying elephants, rocket-propelled tortoises and cuddly polar bears which slide around on two legs. And all because the world is under siege from a balloon trickster with a mountain of plastic inflatables and a lot of puff.

What to do about it? Well, once you get the hang of the unicycle, the answer is simple: explore. The game, of the platforms genre, is two-dimensional and scrolls in all directions. By wheeling along and bouncing up, you can move around platforms made sometimes from rock, sometimes from alphabet blocks and other times from strange, stripey wallpaper. The idea is to collect diamonds, track down the balloons and avoid inflatable nasties, and platforms with gaps. It is quite hard at first but quickly becomes familiar.

You start the game unarmed but a powerup bonus gives you a red nose, just to make you feel even more stupid. This is actually a powerful weapon, and a pair of shades makes you look cool, even though they don't do anything useful. The game is set over 30 levels which interconnect via a set of pink doors which you can walk into.

Cycloids is brightly coloured. A parallax scrolling effect on the clouds and other objects provide depth, contributing to the satisfying overall feel. The game was written by Tom Cooper, author of the excellent *Ixion*, and much of *Ixion*'s professionalism has been applied here. My only complaint is the bizarre disc protection system that sometimes asks for your name and address then promptly disbelieves you and refuses to load the game.

Johnny Byrne

KILLER BUGS

Supplier: CIS
Tel: 071-226 3340
Machine: 32-bit
Price: £19.95

Can you kill two birds with one stone? That is the question I was asking myself by the time I reached level 15 of *Killer Bugs*, because them birds just kept swooping and my fire-button finger was beginning to swell. Of course it wasn't just the birds, there were deadly balls bouncing merrily all over the place.

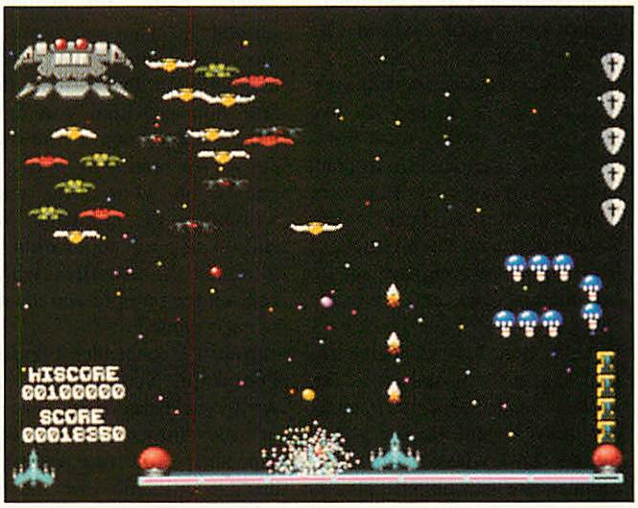
And it wasn't just the balls. Some mutant space ship with goofy teeth was really winding me up with its silly pop gun. To add insult to injury, a string of cheeky miniature flying saucers kept zooming around, in caterpillar formation, stealing my bonuses.

Did I let them get to me? No way. They may have thought they had the advantage of surprise attack but they were wrong because *Killer Bugs* reminded me of the classic *Space Invaders* the moment I began playing and there's only one rule: fire.

The controls are simple: left, right and fire, and the laser-phaser gun thingy you control moves across the bottom of the screen firing upwards. Handy really, since that is where the killer bugs come from. They drop out of their spaceship and flap around looking like angry metallic birds of prey that have just been rudely woken up. Then they spot you.

The first level is a doddle because the birds act like they've just woken up too, so you can pop them out of the sky with sadistic ease. I guess what happens later is that their buddies set their alarm clocks a bit earlier because there's no snoozing going on by the time you get to level five.

To make matters tricky there are the bouncing balls which appear on the screen



Death from above with Killer Bugs

closely packed together and then explode all over the horizon to get in your way. Most insulting are the caterpillar-saucers which drop brown splodges on the floor, which kill you if you touch them.

The object is to get through each level without the killer bugs nicking the bonuses that sit on the edge of the screen.

Killer Bugs is addictive enough – I enjoyed playing it and will want to again – but it hardly breaks any frontiers of excellence. It is spoiled by the fact that it looks eight years out of date. The graphics are so small that the characters look a bit flat and their animation is virtually lost.

Sam Greenhill

THE LOST TREASURES OF INFOCOM – Vol.1

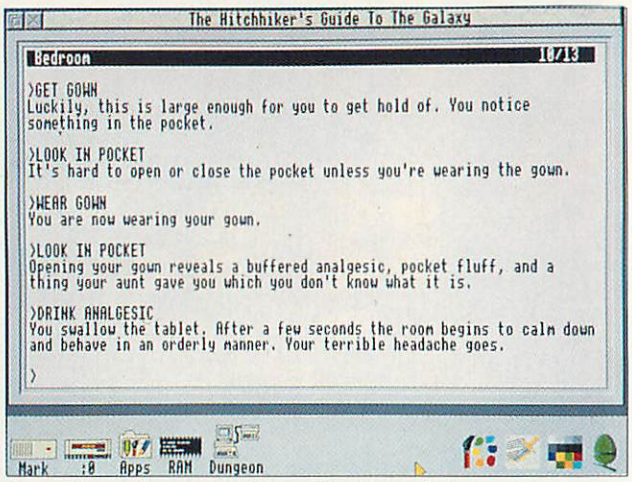
Supplier: Virgin Games Centre
Tel: 071-637 7911
Machine: 32-bit (using public domain front end)
Price: £45.99

Nearly 15 years ago, a game called *Zork* made its first appearance on the campus of the Massachusetts Institute of Technology. It caught on with the students at first and then became so popular that it was ported to every computer platform imaginable, becoming a legend in its own runtime.

Zork was the first adventure game to use an interpretive English parser which understood whole sentences. Predecessors like *Colossal Adventure* (the first ever computer game) used two word verb + object commands. This breakthrough allowed players to string commands together, and specify what they wanted more accurately and in more natural English. For example, they could say something like 'put the rusty key in the cardboard box then go west,' and the game would do exactly that.

And so Interactive Fictions, or adventure games as we know them today, were born. Previous attempts to interact with computers for fun were seen as rather sterile when compared with the products of Infocom, the company set up to market *Zork* and its many successors.

It's hard to conceive of videogame nostalgia, but along with *Pong*, this is as close as it gets. People's eyes mist up when Infocom's games are mentioned. This is because they were well written and had depth, substance and, most important, humour. You could wander around to your heart's content, picking up objects as you went, solving fiendish logical puzzles with them, and talking to the other characters you encountered. Infocom published a plethora of games over the next decade with plots ranging from the absurd to the sinister, but always written with style and wit. There were fantasy games, whodunnits, circus tales, Arthurian legends, sci-fi... the list is impressive. Sadly though, their wares never found their way onto Acorn machines. And there, you might think, the trail runs dry...



One of the classic games on The Lost Treasures of Infocom

However, the happy news is that Virgin/Activision has just released two compilations entitled *The Lost Treasures of Infocom* with no less than twenty of its original titles on each. What's more, there are several more still available separately. The bad news is that the games are only available on PC format. But fear not, provided you have gone out and bought your own copy, you can still play the games on your Arc, even without a PC emulator. We simply use an application to interpret the datafiles which contain the compressed details of each game.

Acorn User reader Edouard Poor from New Zealand has written a brand-new version of his Infocom interpreter especially for our monthly disc, to coincide with the re-releases. The new version runs neatly in a window on the desktop and lets you play all Infocom adventures up to Version V. This effectively opens up a total of around 50 of the finest adventures ever written to Arc users for the first time.

First you have to port over the files, which have a *DAT* suffix – *ZORK.DAT* for example – from the PC discs. This can be done using an application such as *PCDir* or *PCAccess* if you have a Risc OS 2 machine. Next, set the Arc version to filetype &061. Now you're ready to roll. Simply double-click on the adventure file, and the Interpreter fires itself up automatically. Game positions can be saved and loaded in the usual manner allowing you to proceed at your own pace.

'Reading the text of an Infocom adventure is like reading a good novel,' says Kevin Cheung, the remastering engineer responsible for dusting off the games. 'Because you have to use your imagination, the graphics in these games never become obsolete.' And he's right. Infocom's games always require a tremendous amount of lateral thinking and can get players more wound-up than any other type of game. I myself have been trying to finish *The Hitch Hiker's Guide to the Galaxy*, on and off, for about three years, starting on a PC.

Only recently, with the help of a couple of hints from the weighty documentation that comes with the compilation, have I finally cracked it. The feeling of satisfaction and accomplishment is quite wonderful. The game is as intricately structured as the plot of Douglas Adams' novels, and contains a lot of surprises. Kevin Cheung reckons 'Infocom's stuff should be introduced to younger gamers who may have never even seen a text adventure,' and I wholeheartedly agree with him.

Of course, adventures have moved with the times, and now have super-duper animated graphics, and parsers which can do anything, short of make sense out of Tibetan regional dialects. All this progress has culminated in Magnetic Scrolls' astonishing *Wonderland* (which actually comes with its own GUI Operating System). But for the real thing, give me an Infocom adventure every time. Edouard's application gives you the chance to see a little bit of computing history.

The package contains 20 games, all but one of which will run under the Interpreter application on this month's *Acorn User* disc.

At less than the cost of two standard Arc games, £45.99 (PC dual format), represents superb value for money. This works out to a ridiculous £2.30 per adventure. Each game comes with its original documentation: full instructions, maps, hints and tips (making for a total of over 650 pages of backup material).

The package contains *Zork*, *Zork 2*, *Zork 3*, *Beyond Zork*, *Stationfall*, *Enchanter*, *Sorcerer*, *Spellbreaker*, *Deadline*, *Witness*, *Suspect*, *Lurking-Horror*, *Ballyhoo*, *Infidel*, *Moonmist*, *Planetfall*, *Suspended*, *Starcross*, *Hitch Hiker's Guide to the Galaxy* (plus *Zork Zero* which only runs under the PC emulator.

Also Available: *Lost Treasures – Vol.2*, as well as several other titles sold separately (from £9.99).

Matt Tizard



£15 STAR LETTER

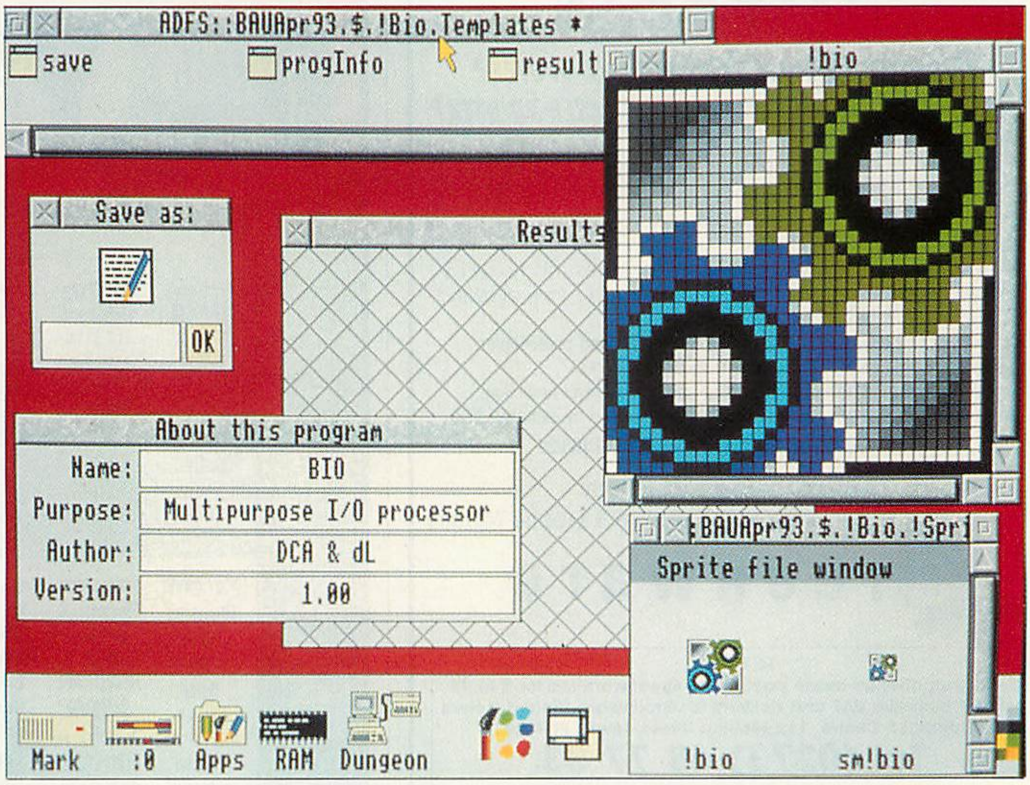
I find the desktop applications in the yellow pages of *Acorn User* to be very useful, but sitting down to type in the seemingly endless lines of sprite and template files is a daunting task.

Could you alleviate this problem in some way, possibly by printing the sprites so I can create them in *Paint*? You could also have pictures of the templates so that people with template editors could create them by hand; it would make life so much easier.

C Smith
Cleveland

There are a number of problems which would create havoc if we printed sprites and templates. First up, how do you print a colour sprite on yellow pages? Also, 256-colour sprites would be impossible to print easily, and large sprites would take up far more space than the listing version.

As for template files, printing them pictorially would be nearly impossible, as we would have to describe window dimensions, icon numbers, colours, button types and a whole load of other attributes. The listings are accurate and compact, though a little tiresome to type in. Of course, you could always subscribe.



Could you create sprite and template files from this? No, neither could we.

MASTER OPINION

With reference to your review of *Masterfile III* in the May issue, your reviewer, Graham Bell, wrote his considered views on the capabilities of *Masterfile* as a valuable database for Acorn users. Quite rightly he tried to balance his article by using comparisons with other database packages, but unfortunately it is here he becomes unfair.

Is it really a fair comparison to judge any product against others which maybe cost up to two to three times as much? This is surely like comparing a Vauxhall Cavalier with a Mercedes. If I was a customer then I would think it reasonable to expect that if I paid more, I would receive more.

Masterfile III was specifically designed to take over from *Masterfile II* as an easy-to-use and powerful database system. What we supply is a database that most people can use easily for storing, manipulating and retrieving data at a reasonable price – Graham seems to agree that we have achieved all these aspects.

At this price it was never designed to be relational, programmable or networked, and was never promoted as such.

Masterfile III's capabilities are vastly greater than 'cataloguing the record collection'. I'm all for fair and comparative reviews, but do make the comparisons fair.

I MacDougall
Risc Developments

Graham ended his review by saying: 'A shade under £50 is probably about right for what *Masterfile* offers, but beware; as your needs grow, you may need something more sophisticated.' The comparisons were made with other databases because they represent the state of the Archimedes database market, but there were also comparisons made with the eight-bit databases *Masterfile II* and *ViewStore*. *Masterfile III* is a very good package as far as it goes, and the reviewer intended to show exactly how far that is.

ELECTRON-TASTIC

In your April 1993 issue you carried a question about transferring files from an Electron tape to an A3000. I have written a public domain program called *BBCTape,* written to copy files from tape on a BBC model B via a serial cable, so you would need the serial chips to be fitted to the A3000. The program should work on an Electron, though you'll need to upgrade your Electron with a serial port.

S Burke
Luton

***BBCTape* is available from APDL, 39 Knighton Park Road, Sydenham, London SE26 5RN.**

LEMON AID

After reading Absolute Beginners in April, I have found myself in an unusual position. I feel I have to disagree with your piece on Master Compact Econet ports and Maris Pipers.

I have found, after hours of painstaking work, that if a lemon is used instead of the potato, not only is the range extended by a further 200 miles, but I can connect to other makes of machine, including PCs and the Sega MegaDrive.

Also, I would point out that if a potato is connected to your brand new A3010's headphone socket, not only can you hear your machine's glorious stereo sound, but so can the whole of the ex-Soviet Union.

A Campbell
Hamilton

Keep taking the tablets...

BYE-BYE BEEB

Now that the Beeb is officially dead (the Master is no more) why doesn't *Acorn User* go over to 32-bit completely? I've recently upgraded to an A3010, and all those eight-bitters don't know what they're missing, I can tell you. It's not as if there's much eight-bit stuff in *Acorn User* anyway. Go on, bite the bullet harder.

J Parker
Somerset

Can of worms, anyone?

Co-ordinate IT

Oak Solutions Educational Products

Summer Term 1993

Platform Independent Software

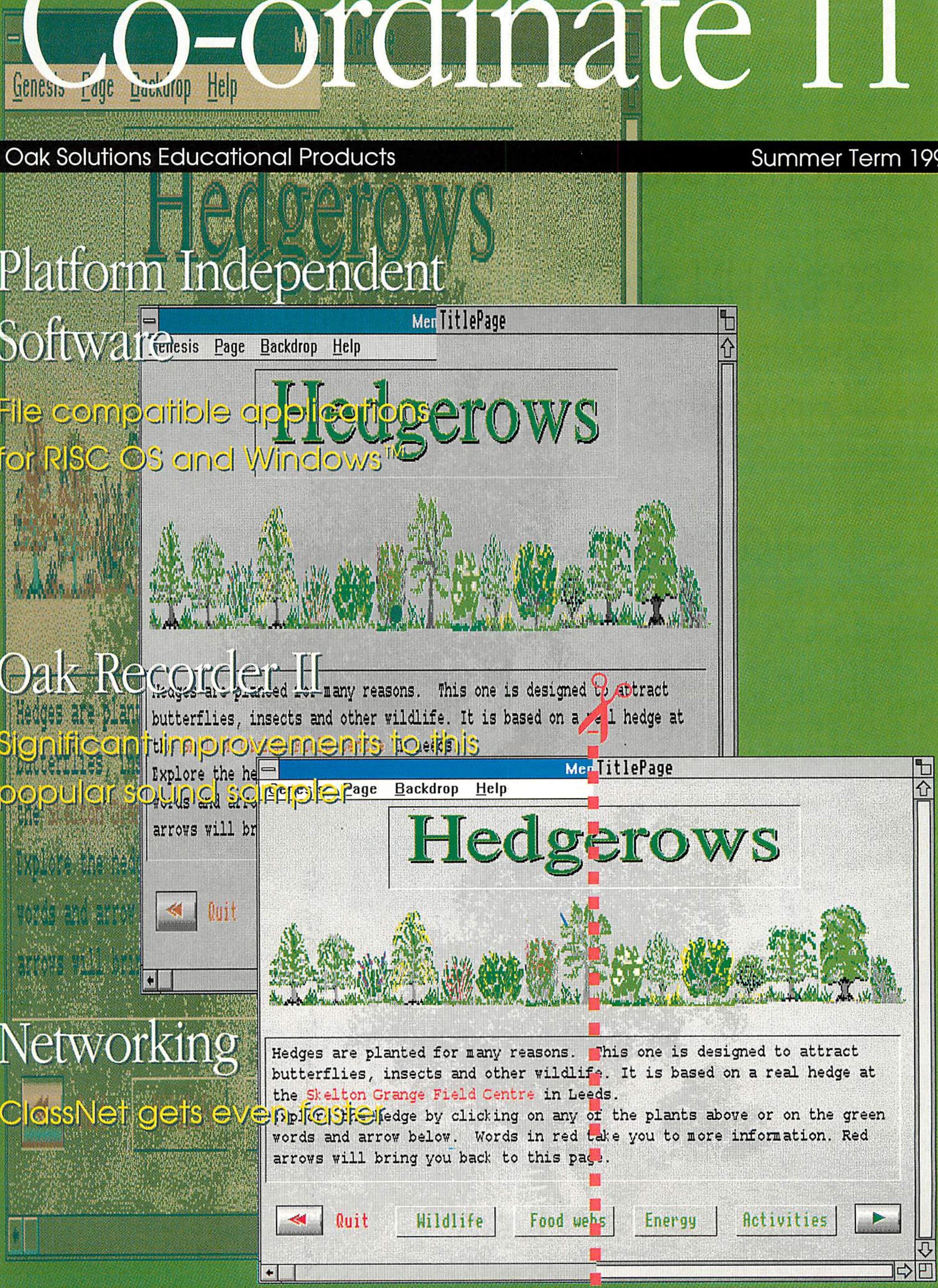
File compatible applications for RISC OS and Windows™

Oak Recorder II

Significant improvements to this popular sound sampler

Networking

ClassNet gets even faster



Platform Independent Software

Welcome

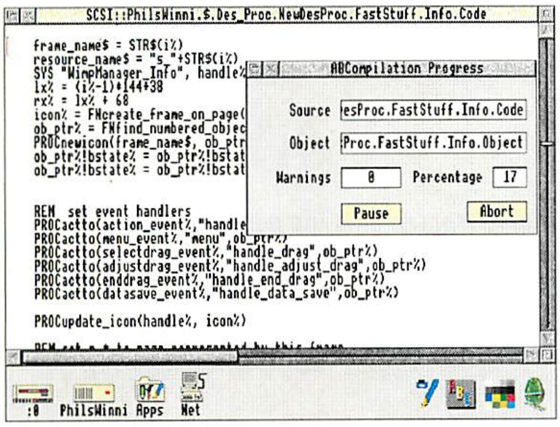
This issue of Co-ordinate IT sees our first Windows applications (previewed at the BETT exhibition) unleashed on the general public. Genesis and Oak Draw for Windows give us a firm base to extend our range of courseware and CAD applications across the two most common hardware platforms found in UK schools.

It is heartening for us to see that there is already cross fertilisation. Applications are being developed by educationalists using Genesis for Windows, which will eventually be released on the Archimedes platform thanks to the file compatibility across machines.

For those who have missed the last edition of this magazine, Oak Solutions and Ace Computing merged earlier in the year after many years of working closely together.

One repercussion of this merger is that our order processing system was unable to cope with the upsurge in business, and so we have written a new Archimedes based system, linked by telephone between our two sites. Using the new system, orders and queries will now be processed by our Cambridge office (Tel: 0954 211760).

ABC BASIC Compiler



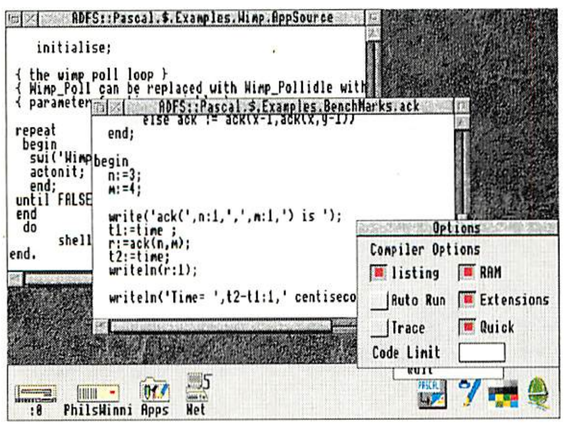
Education Price £69.00

+ £2.00 p&p + VAT

The Archimedes BASIC Compiler is the only serious BASIC compiler available for the Archimedes. It is especially suited to the serious user who requires the speed and protection of a compiled language whilst retaining the flexibility of using an interpreted language during the development phase. Compilation under Version 3 takes place as a RISC OS task thereby allowing the machine to be used for other jobs at the same time. Relocatable modules may be created allowing star commands to be implemented, along with library modules which can contain functions and procedures which may be called from any program compiled using ABC, including Genesis.

Cambridge Pascal

The Cambridge Pascal compiler supports a comprehensive version of the Pascal language and includes many extra features such as full string and error handling. Additional extensions allow the use of random access files and provide direct access to the operating system routines including star commands. The compiler runs under the RISC OS desktop and supports conditional compilation, include files and compilation to relocatable modules. Comprehensive error messages and a trace facility ease the development process. A library of procedures and functions is provided to support access to the window manager. Cambridge Pascal conforms to BS 6192: 1982.



Education Price £69.00

+ £2.00 p&p + VAT

Contents

The best thing to happen to hard discs since they became affordable

Every school would love hard discs on their computers and now that the prices are dropping this is becoming affordable.

However, adding hard discs to many computers brings its own set of problems; files being deleted, discs being filled with games, infection with viruses, keeping all the drives up to date and so on.

Oak Solutions have tackled these problems with a unique product known as ClassRom. ClassRom takes any Acorn or Oak Solutions hard disc and splits it into two; a read only area for applications and a read/write area for scrap files and temporary storage.

The children can access the applications but cannot delete them, move them or alter the contents of the drive in any way. They can use the scrap drive and copy the data off to floppies or a network at the end of the lesson. Using ClassRom means that you can be confident that the applications are always available for the children to use.

The ClassRom management software allows you to 'unlock' the applications disc and add or delete files. If you have a network, you can then transmit these changes to all the other hard discs automatically.

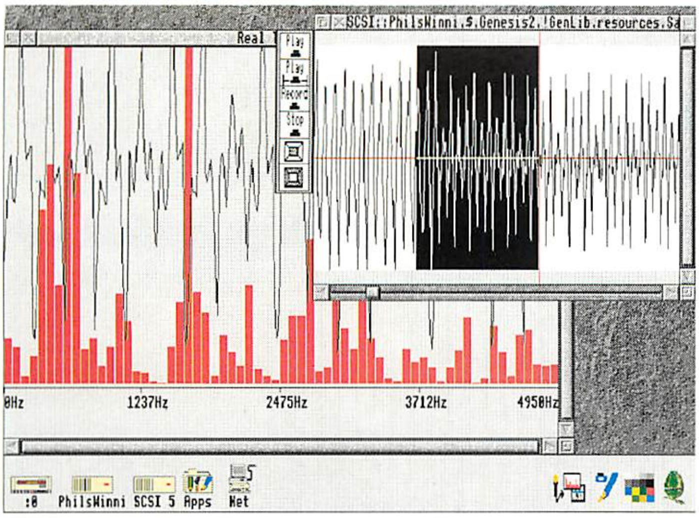
This combination of protection and management really does allow you to get on with the job of teaching rather than worrying about the technology.

Class *Rom*

intelligent resource management

Oak Solutions Ltd Broadway House 149-151 St Neots Road Hardwick Cambridge CB3 7QJ Tel. 0954 211760 Fax. 0954 211767

OAK SOLUTIONS



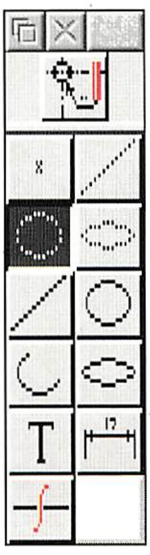
Oak Recorder II a sound investment for you

A new version of the popular Oak Recorder sound sampler has just been released. There are three main areas of improvement. A new, higher quality microphone is included which features an electret capsule with cardioid polar response to eliminate unwanted background noise. The microphone now connects to the interface via a socket to allow other devices - from CDs to electric guitars - to be connected. Oak Recorder II is now supplied with SoundLab software as standard, which allows more versatile editing as well as giving oscilloscope and spectrum analysis displays. Samples can now be saved in either Armadeus or Relocatable Module format. Oak Recorder II costs £34.95 + £3.00 p&p +VAT (education)

The fastest network for the Archimedes just got faster

A year after the launch of the ClassNet high speed Ethernet networking system, Gary Stephenson, Oak Solutions' network guru, has designed a new filing system to further speed up access to remote hard discs across the network. Current systems are limited by inefficiencies in NETFS which particularly affect the loading of applications. ClassShare II provides read and write access to remote ClassROM hard discs, delivering virtually the full performance bandwidth of a local hard disc. Each user has a private read write area and all users on a particular server can share a common read only area for applications. The server software runs in the background - if the user exits the desktop, the server keeps working!

Drawing your own conclusions with WorraCAD



A new release of WorraCAD launched at the recent Acorn User show has brought this very popular CAD system up to date.

WorraCAD retains its unrivalled accuracy and ability to create real world dimensioned technical drawings with a minimum of fuss, and gains a super new icon based user interface and the ability to deal with ellipses.

As a RISC OS compliant application, WorraCAD supports export of drawfiles to other applications, and can talk to a wide range of printers via RISC OS drivers, and to plotters, cutters and engravers (including the Roland CAMM series) via its own built-in HPGL drivers

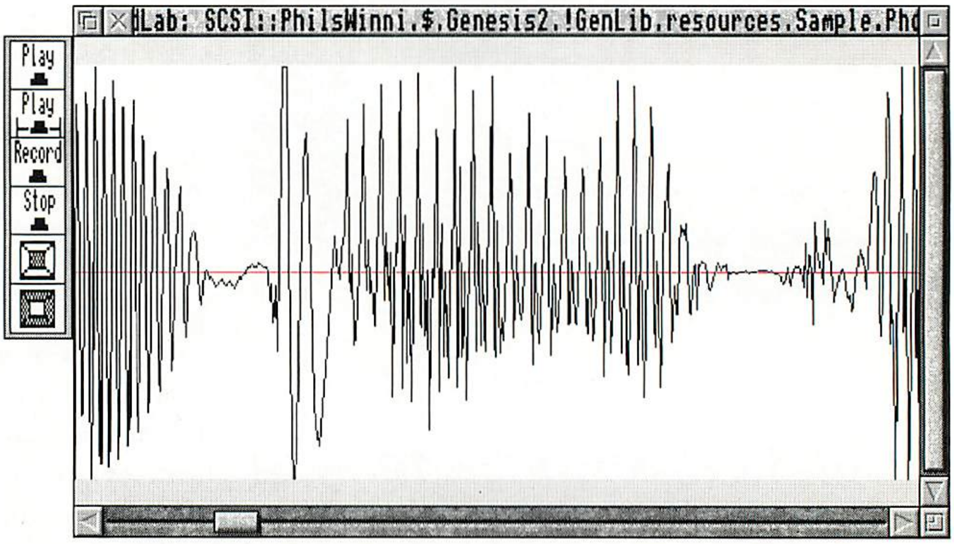
The price of WorraCAD remains the same at £69.95 + £2.00 p&p + VAT (education).

Oak Solutions' Administration Moves South

Following the merger of Oak Solutions and Ace Computing earlier in the year, a new order processing and accounting system has been installed and the bulk of Oak's sales order processing activities have moved to the Cambridge office. In future, all queries and orders should be directed to the Cambridge office at Broadway House, 149-151 St Neots Road, Hardwick, Cambridge CB3 7QJ. The telephone number of the Cambridge office is 0954 211760, and the Fax number is 0954 211767. Technical queries should be directed to the same telephone number after 2pm.

Sample the Oak Recorder II

Oak Recorder has been around for two years now, and has become the best selling sound sampler for the Archimedes. The new mark 2 version is destined to be even more popular thanks to its increased sound quality and versatility.



Oak Recorder II consists of a microphone which plugs into the parallel (printer) port of any Archimedes computer (including the A4) via a small 'dongle' type interface. The microphone is a new design with a unidirectional electret capsule which helps to eliminate unwanted background noise. The microphone has an even more robust metal body and is supplied with a clip for connecting to a microphone stand and an attractive carrying case. The microphone can be used separately from the sampler interface, for example with a cassette recorder.

Instead of being wired directly into the interface, the microphone plugs into a socket on the dongle case. An adaptor is provided to allow a variety of other sound sources to be plugged into the interface. Other microphones, CDs, HI-FIs and even musical instruments can be sampled to great effect.

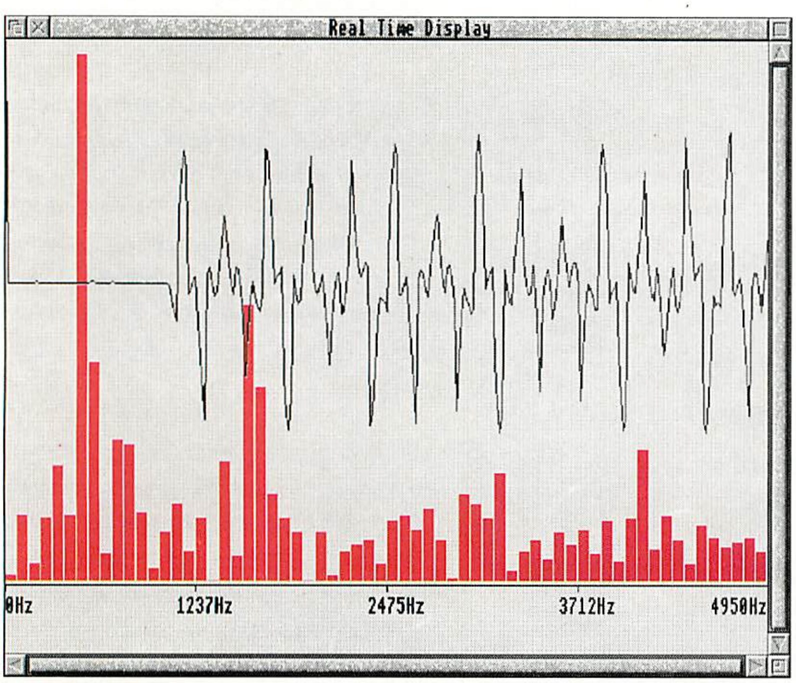
One interesting option is to fit a headset microphone and plug the headphones into the audio output socket of the Archimedes. In this way you can build a 'Language Lab' style workstation for use in the classroom. A recording level control is provided on the interface to cater for the varying levels available from these different sources, but is protected from being twiddled accidentally or by curious younger users, by being recessed behind a small hole in the dongle case.

The Oak Recorder II is supplied with SoundLab software. The software allows samples to be recorded and edited in a variety of ways. The sampling rates on both record and replay can be varied to alter the pitch of the sound, and samples can be inserted into other samples to allow sentences or complicated sound effects to be built up.

A fast Fourier display allows the frequency spectrum of the sampled sound to be analysed, and an oscilloscope mode displays the waveform and Fourier analysis on screen in real time. A further display option, 'voiceprint' shows a realtime graph of frequency and amplitude against time.

One of the most powerful features of the Oak Recorder is its ability to be controlled directly from Genesis. The Genesis keywords 'GETSAMPLE' and 'PLAYSAMPLE' allow Genesis applications to be created which can capture and replay sounds from the microphone. This can be exploited to great effect in modern languages, or in music for setting up sight singing exercises. The user can listen to a pre-recorded source, record their own version and then compare their attempt with the original simply by clicking the mouse over the appropriate icons.

Samples can be saved in either Armadeus or Relocatable Module format and hence, can be used with virtually all Archimedes sound software. Star commands and SWIs are provided to allow users who write their own software to record and replay samples.



Oak Recorder II is available now and costs £34.95 + £3.00 p&p + VAT (education)

Genesis

multi-platform multimedia

Genesis has been available for the Archimedes for over three years. During this time it has undergone several changes and improvements. Now that Oak Solutions have developed a version for the Windows operating system from Microsoft, PC users can benefit from the power and flexibility of this amazing product.

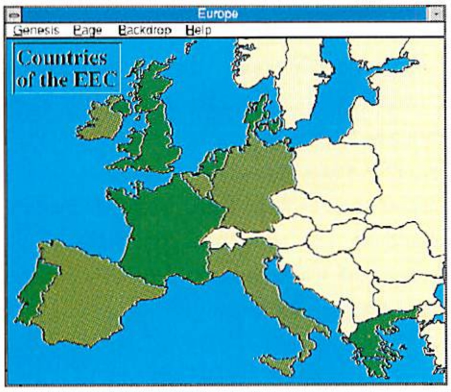
One of the questions that we are most frequently asked is What exactly is Genesis? The answer is that Genesis is an *interactive multimedia authoring package* but this probably needs a little explaining.

Genesis is an authoring package as it allows users to create their own databases of information. These are not databases in the traditional sense of records and fields but simply information which can be retrieved in a structured manner. The main idea behind an authoring system is that it allows non computer experts to create a computer based resource without having to understand too much about how the computer works.

Genesis is multimedia because the information that can be stored consists of many different types; text, pictures, music, animation, and even movies. Traditional databases are limited to text with perhaps the addition of bitmap pictures. Genesis can store almost any type of information that you give it.

Genesis is interactive because the user is in control of the information they receive. Compare this to a TV programme where the producer has decided on the flow of information to the people watching. With interactive systems you can follow your own thought processes to find out the information you want rather than being fed the information by someone else.

A typical Genesis application consists of a number of pages of information linked together in the most natural way. A user navigates around the pages by pointing and clicking with the mouse. A simple example is shown by the picture of Europe below. The map of Europe has several links to other pages of information about each individual country. Hidden links over the map allow the user to access the other pages. On the country pages, further links may take the user to more details of individual towns and cities.



The concept of interactive multimedia is not new and there are many products which are available for most types of computer which do a similar job. However, Genesis is the only system which has been developed in conjunction with education and designed specifically for use by children as well as teachers.

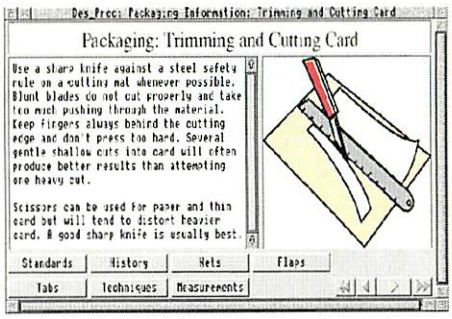
Genesis has been available on the Archimedes for three years and has proved very popular and successful in schools. Children are using it to record the results of project work and field trips by combining scanned photographs, recorded sounds and even movies into their own applications. They also use professionally developed applications for interactive modern language learning, historical simulation and Design Technology. Some schools are even using Genesis to create an electronic prospectus for the schools which includes a rolling demonstration of selected information which runs continuously in the entrance hall.

Many teachers find that Genesis is an ideal tool for creating resources for the children to access. The teacher can enter their knowledge of a particular subject into the system and provide access to the information for the pupils.

Whilst being simple enough for children to use, Genesis is also powerful enough for professional developers to use to create commercial applications. At Oak Solutions, we have produced a number of high quality multimedia applications using Genesis. Many of these applications not only make use of computer graphics and sounds, they also link into video laser discs and CD audio when appropriate. Genesis lets you do this with minimal technical knowledge.

The Design Processor, Oak's powerful Design Technology product is controlled by, probably, the largest Genesis application yet produced. Genesis manages the environment, combining 8 megabytes of data and all the applications that are required to manipulate it. Other companies also use Genesis for creating multimedia applications. Tag Developments Ltd have developed a suite of 'Mapper' applications aimed at primary schools including Bodymapper, Weathermapper and Homemapper.

Creating your own Genesis applications is straightforward. Firstly you have to think about the structure of the information; identify the pages you want to create, what information is to appear on the pages and how they are linked together. The second step is to collect together all the resources you are going to use on the pages. This may involve creating draw files, text and sprites but could involve scanning photographs, digitizing images and recording sounds. Once all the resources are collected you have to add them to the pages and the finally link the pages into the final application.

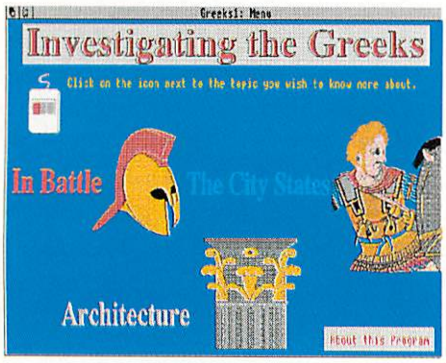


All the facilities of Genesis Plus on the Archimedes are now available to users who have access to a PC running Microsoft Windows 3.1. We have tried to ensure that users who know Genesis on the Archimedes will find Genesis for Windows familiar whilst retaining the Windows style of user interface. Genesis for Windows accepts text, PC bitmaps, wave files and midi music files in addition to Acorn drawfiles, sprites, sound samples and Ace films. This element of compatibility means that many Genesis applications created for the Archimedes can be run on the PC without change. We believe that in these days of mixed computer schools the fact that children can work on an application on one system and move it to another is very important.

Genesis for Windows costs £69.95 + £2.00 p&p + VAT (education)

Multimedia in the Classroom

Tony Holdstock takes a look at some Oak Solutions' multimedia offerings for the classroom



History Lives!

'Investigating the Greeks' from the Hampshire Microtechnology Centre, is the latest in the range of Genesis applications now available to support the teaching of history.

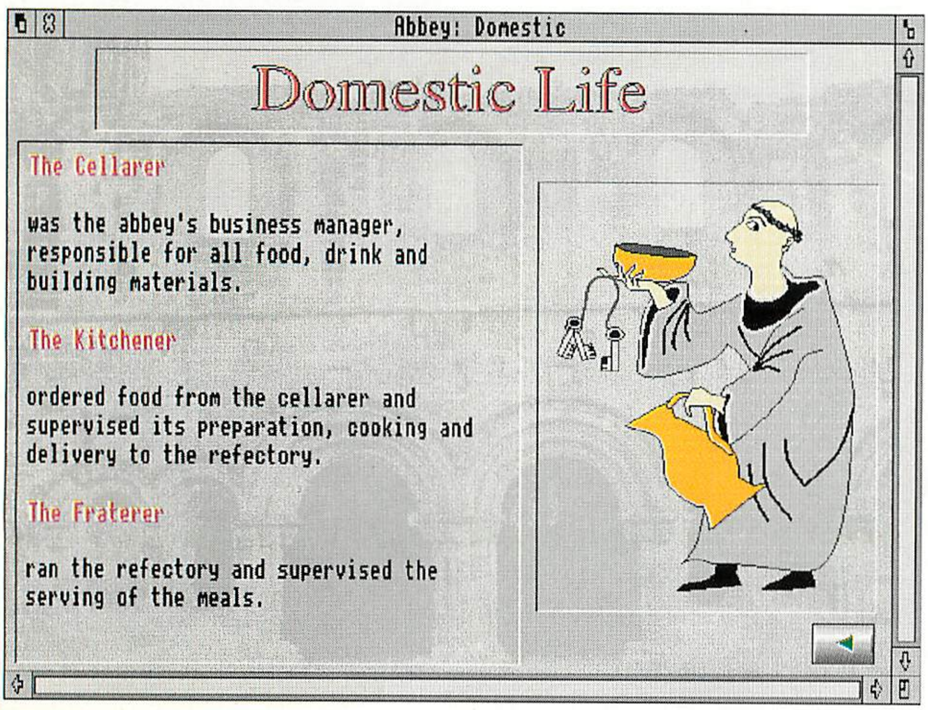
Three discs are packed with informative text and some of the best Drawfiles we have ever seen.

'Greeks', together with 'Ancient Egypt', 'Saxon Life', 'Viking Invaders', 'Castle Life', 'Cistercian Abbeys', 'Investigating Local Industry' and 'Battle of the Somme' provide an unrivalled resource for bringing history to life in the primary and secondary classroom.

All these applications contain a large amount of information in the form of text and graphics. These resources may easily be saved for use in children's own DTP, project work etc.

Other features to be found include music files, animations, CD audio and, (in Battle of the Somme), full screen moving video and soundtrack from Laserdisc.

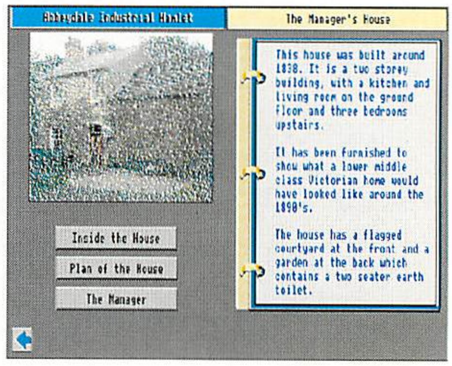
This means that the applications can be used in many ways. They may become part of your library resources, to be consulted by individual pupils working independently. They may be used via a network by a whole class or large group of children. For the many teachers working with a single stand alone machine in the classroom or corridor, they can become the the basis for work by groups of children working as part of a circus of activities.



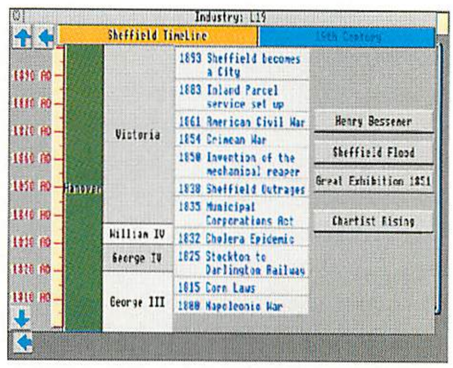
Local Industry

Three screenshots from 'Investigating Local Industry' illustrate the range of materials and learning processes which may be involved.

'Local Industry' is one of the biggest Genesis applications so far, with over 500 pages, and provides materials for any of the scenarios described above.

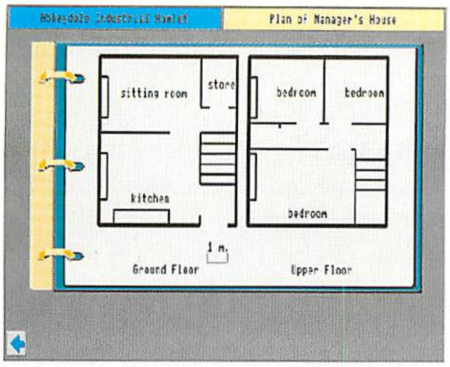


The first screen shows the use of text and a scanned colour photograph, as well as multiple links to other pages, so that users may choose their own routes or decide for themselves which options to choose to achieve a set task.



Next, a time-line screen shows multiple links and helps the user to relate the detailed local factual and pictorial information from the previous page to other events in that period of history.

This ability to link and relate the people, events, discoveries and the arts of a period is one of the most powerful features of Genesis in the context of history teaching.



The third screen is an example of movement to even more detail. It shows a plan of the factory manager's house shown on the left.

From this page, it is possible to move on and see detailed photographs of the interiors of the rooms, furnished as they would have been when the house was built in 1838.

Databases, maps, original documents and photographs make this a fascinating resource for the student of history. But multimedia has many other uses in other subject areas.

Modern Languages



Genesis is becoming well known, in conjunction with the Oak Recorder, as the best multimedia system for the teacher and student of modern languages.

Oak Recorder is a simple, cheap and extremely effective way for teachers and children to record sampled sound. The microphone plugs into the printer port of any Acorn computer. No extra hardware is involved - the microphone is entirely self contained.

It is easy for teachers and students to record words and phrases and to play them back through Oak Recorder's own control panel. Perhaps even more powerful is the ability to drop a recorded sample onto a frame in a Genesis page. If the frame already contains words or a picture, clicking on it will play the sound sample.

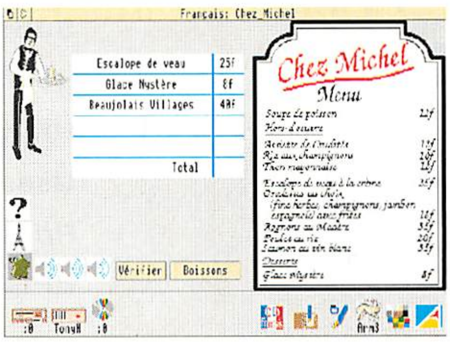
A development of this technique available to users of Genesis II is the use of the Genesis Script Language commands GETSAMPLE and PLAYSAMPLE. These make it possible to start Oak Recorder by clicking on one frame, record your own voice then hear the result by clicking on another frame. A page such as that shown below left allows the user to listen to phrases recorded by a native speaker and to respond to them by clicking on the microphone icon. They can then either repeat the phrase or respond appropriately. Finally, the user can play back his own attempt, and compare it with the original.

CD Français

One of the most exciting implementations of Genesis in modern language learning is CD Français, produced jointly by Oak Solutions and the Leeds EdIT Centre as part of the NCET Audio CD project.

Here, a series of language learning scenarios of the type found in all courses are presented on screen.

The example shown is a scene in a café. The user clicks on a loudspeaker icon, then listens to a dialogue recorded on CD. This can be paused, played back in parts or repeated as often as necessary. The objective is to identify the menu items ordered in each dialogue, click on them to enter them on the bill and finally to enter the total cost.



The computer checks to see if this is correct and either gives a spoken reward or prompts the user to try again.

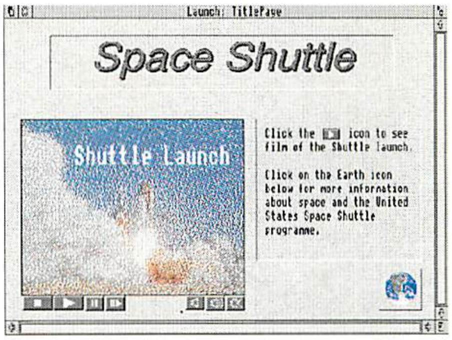
Over 50 varied activities based on different areas of France help to motivate flexible learning in the modern languages classroom.

What Next?

Genesis can be used with hard discs or CD ROM drives to show Acorn Replay films (see the example below). It can also use the vast storage capacity of CD ROMs for resources such as sampled sound, photographs and animation, as well as conventional text and graphics files. It will also support the use of a video digitiser as well as Photo-CD using Acorn software.

A continuing programme of development and technical support will ensure that Genesis will remain the easy-to-use, flexible solution for those who wish to develop multimedia in their own classrooms. The Windows version allows Genesis applications to be used on a wider range of platforms.

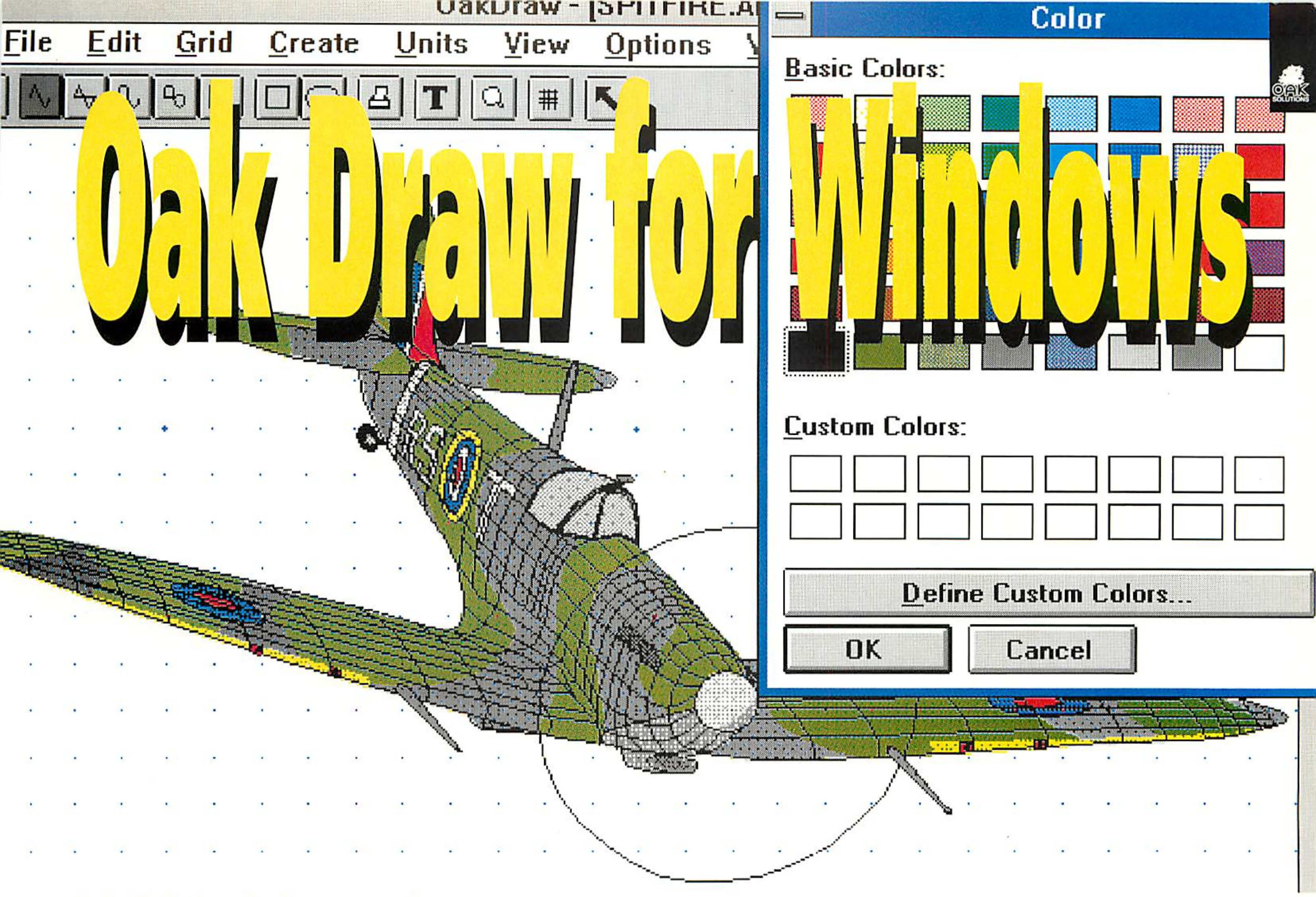
At the same time it remains the choice of teacher training institutes like De Montfort University, Leicester and of organisations like the National Trust who need reliability, simplicity of use and the ability to deliver a complete solution.



Like all Oak Solutions' Genesis applications, those mentioned in this article are sold as site licences, so that the user may freely copy both the discs and the paper resources which accompany them for use within the purchasing establishment. Contact Oak Solutions on 0954 211760 for details of prices.

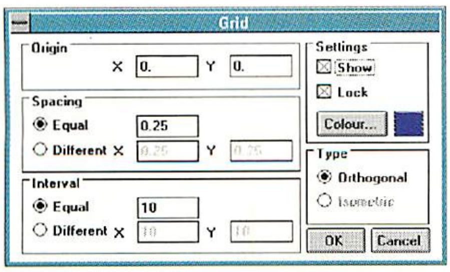
Past, Present and Future

Oak Draw for Windows



Oak Solutions' plan to make software choice independent of hardware moves one step closer with this superb new drawing application.

One of the finest and most widely used applications on the Acorn Archimedes is Acorn's excellent !Draw package. It combines a simple and logical user interface with a well designed and versatile file format. Many graphical applications (including Oak Solutions' own 'OakPCB') use data formats based on extensions to the Drawfile structure. These factors have combined to ensure that the Drawfile has become the standard vector graphic format throughout the Archimedes World. Virtually all applications capable of dealing with graphics can both import and export Drawfiles.



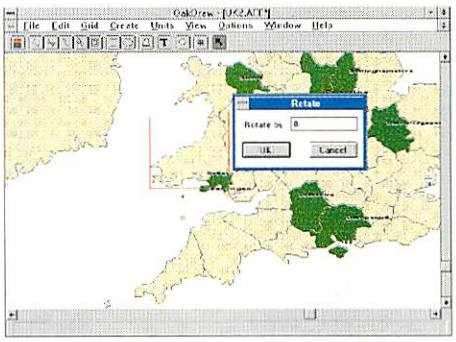
In the PC world, the standard file format for vector graphics for many years has been the metafile. This file uses a 16 bit coordinate system (unlike Draw's 32 bit) and has a smaller and less powerful range of drawing primitives available.

Oak Solutions aim is to provide a comprehensive range of software applications designed specifically for use within education, which will run across all computer platforms commonly found in schools. To this end, they have chosen the Drawfile to be their standard graphical format across platforms, and have produced Oak Draw for Windows, a simple but powerful drawing package capable of reading and producing files which can be used both under RISC OS on the Archimedes, and Windows 3.1 on the PC.

Oak Draw for Windows, will transparently export metafiles via the Windows clipboard to other Windows applications, thereby ensuring integration with both RISC OS and Windows environments. Hardcopy output is provided via the Windows printer drivers, and so a wide range of printers is supported.

The drawing tools provided match those of !Draw on the Archimedes, and work in a similar way. Users of Oak Draw for Windows would quickly come to terms with Acorn's !Draw, and vice versa.

Drag and Drop is also supported, and so loading and inserting of files can be accomplished via the same means across both platforms. Where Oak Draw for Windows differs is that its toolbox is 'soft loaded' at runtime. This means that tools can be added or removed by the user - either to limit facilities available to younger children, or to add further functionality to the system.



Oak Solutions plan to release new tools on an ongoing basis. In this way, the package can grow to include features such as graph drawing, electronic design and technical drawing.

Oak Draw for Windows is an ideal complement to Genesis for Windows and is suitable for use by all age groups.

Oak Draw for Windows costs £69.95 + £2.00 p&p +VAT (education)

ClassNet/ClassRom Update

Since its launch at last year's Access IT conference, the Oak Solutions' ClassNet Ethernet interface has proved to be one of our most successful products.

A very large number of schools around the country are buying complete rooms of computers and require a networking system to interconnect them. ClassNet offers the benefits of using standard Ethernet components whilst remaining familiar to anyone who has used an Econet in the past.

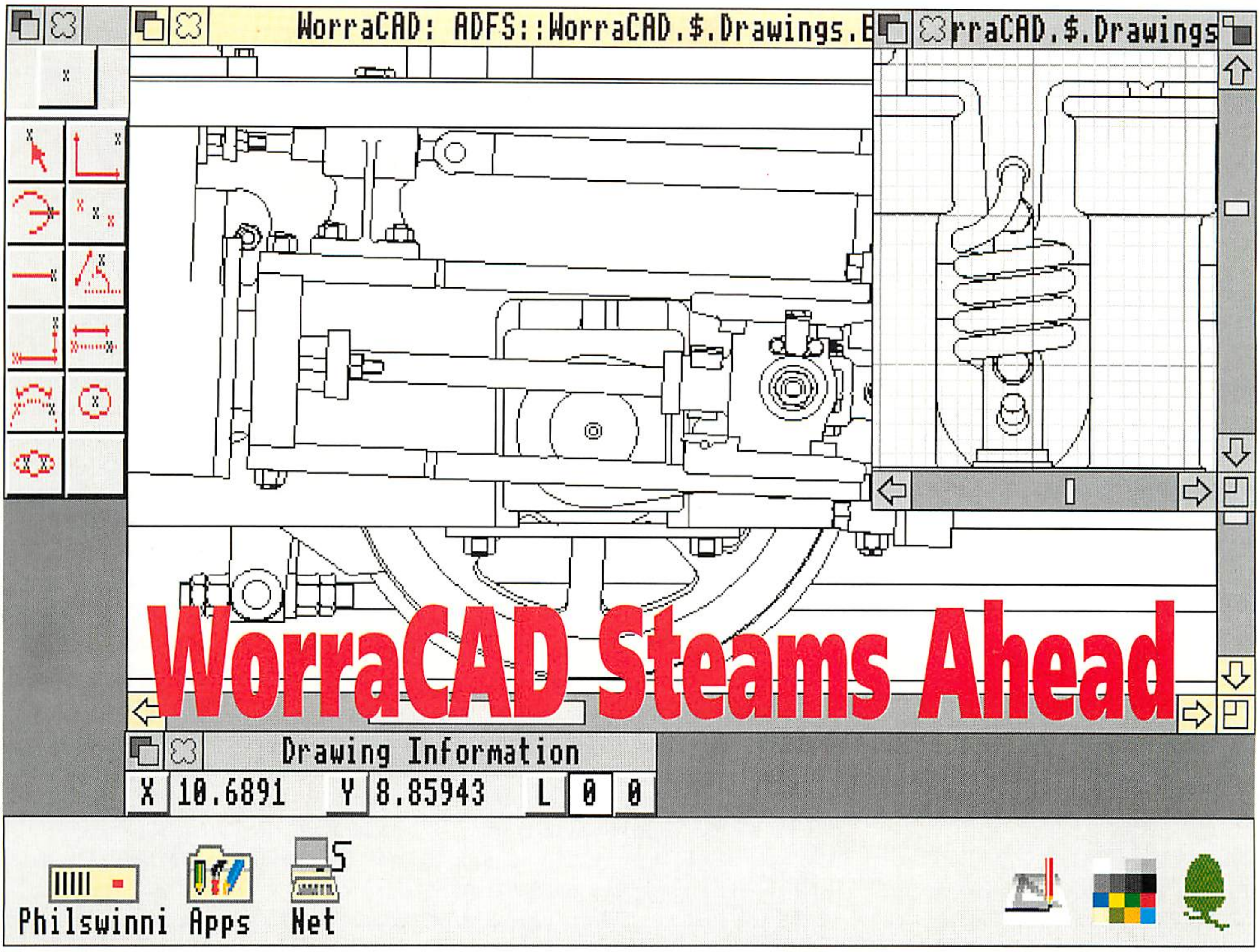
Over the last few months there have been three major developments to ClassNet; combined ClassRom and ClassNet interfaces, the new ClassShare II software and 'network' interfaces for A3020 and A4000 computers.

The new interfaces provide a user of a hard disc machine with the ClassRom protection and management system for the hard disc combined with access to a fast Ethernet. This is an ideal solution for A4000/5000 computers in an educational context. Hard discs give the best way of loading applications. Each user has direct access to their own hard disc which means that they get the highest possible loading speeds. ClassRom ensures that users cannot delete or move files from the hard disc but does allow the users to load them. The ClassRom Management software means that several computers can be updated automatically over the network whenever new software is added or deleted by the network manager.

The new ClassShare II software is an extremely fast disc sharing system for users of ClassNet networks. If you have small clusters of computers which do not have their own hard discs then one way of loading applications is over the network. The Level 4 file server offers one system of loading applications but the performance is not as good as it could be. ClassShare II takes the performance of an Ethernet to new extremes. Users can share the hard disc of another computer, exploiting the bandwidth of the network to the full, with performance almost as fast as using local hard discs. In fact, each user sees a hard disc icon on their icon bar representing the hard disc of the computer being shared. This means that the children can use any computer in the same way; they don't have to learn a different system for machines with hard discs and machines on the network.

The launch of the A3020 and A4000 saw the introduction of yet another style of interface socket for Acorn 32 bit computers; the networking interface. This has meant that we have had to design a third type of ClassNet Ethernet card. This is now complete and should be available during the summer, ready for the autumn term. By using this style of interface rather then the A3000 style mini-podule, A3020 and 4000 users will not use up their only podule slot. The new ClassNet card will support both ClassRom and ClassNet software.

ClassNet cards cost £149 (education)
ClassNet/Rom cards cost £179 (education)
Bulk discounts available on request
ClassShare II costs £149 (upgrade £10 per card plus £35 for the software)



WorraCAD Steams Ahead

WorraCAD was the first Computer Aided Drafting application for RISC OS and has evolved steadily over the years. Changes to the system have been consolidated with a new release which features a revised user interface.

When WorraCAD was launched, not long after RISC OS, it quickly established itself as a top selling CAD system, not least because it remained for some considerable time, the only CAD system for the RISC OS desktop. It integrated well into the desktop environment thanks to its support for RISC OS printer drivers, and facilities such as export of Drawfiles. The ability to both import and export DXF files to and from CAD systems on other platforms, also helped to firmly establish WorraCAD's industrial base.

Designed to simplify the job of producing accurate technical drawings, WorraCAD was loaded with features to create precision geometric constructions quickly and with ease.

WorraCAD is unique amongst CAD applications for RISC OS in that it uses a floating point, rather than an integer model to internally represent its data. This avoids two major problems:

1. Integer packages tend to have great difficulty in dealing with objects larger than A0 paper - the compromise between accuracy and drawing area means that the largest co-ordinates that can be represented by 32 bit integers can only be a couple of metres from the origin. WorraCAD's data format can handle a drawing area larger than the known universe!

2. At the other end of the scale, integer systems soon run out of resolution, so that an object snapped to an intersection point may not quite be accurately positioned upon close examination. Once again, WorrCAD's floating point data structure removes the problem with its ability to resolve sub-atomic distances.

WorraCAD quickly established a large user base, both in schools and in industry. Professional users are quick to suggest ways of improving software they use all day, every day, and so WorraCAD has evolved steadily over the years to make the job of producing real technical drawings quicker and easier, and new features have been added to increase the functionality of the program.

A recent consolidation of improvements suggested by users has culminated in a new release of the software with a revised user interface. The original WorraCAD user interface was based on the RISC OS menu system, but also had a parallel menu structure based on that of Oak PDT. Both these remain (as configurable options) but the new method of driving WorraCAD is via an icon based toolbox. One reason for the change is that pupils no longer get the opportunity to spend a lot of time learning about technical drawing and its terminology, and so a text based menu referring to 'Tangents' and 'Normals' is less readily understood than an icon showing the construction.

WorraCAD in this new guise, remains, perhaps not the most flashy, but certainly the most useful and useable RISC OS CAD system, for those who need to create accurate technical drawings.

Design Processor

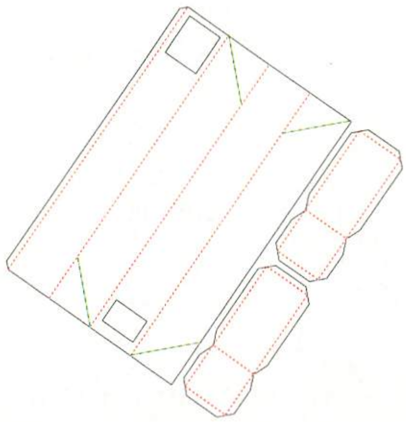
Sally and Daniel were looking forward to starting their new school. They had spent hours during their summer holiday standing upon tiptoe, peering in through the windows of the 'big school'.

They were excited. Some of the rooms were full of machines and equipment, benches and tools and lots of computers. They could hardly wait to be shown how to make things and they were not to be disappointed - this school had Design Processor installed!

The new term started and the first thing they both did in their Design and Technology lessons was to use Archimedes computers to help them make 'quality products which can be tested in use'. Sally's class had been divided into four groups and each group had selected a project from the Folded Card section in Design Processor. Daniel's class were making Zoetropes then designing a means of motorising them.

Sally was making a Periscope for use at carnivals and processions. She was very quickly able to interrogate the database in Design Processor to find out about Periscopes, then to select an appropriate net and modify its sizes to suit her own requirements. She saved the modified net as a CAD file on her own disc and later, on another Archimedes, used !Draw to add graphics.

She had used an Archimedes computer at primary school but had never seen a Plotter operated before. She shrieked with delight when it started up and drew out the net of her own Periscope design on to some brightly coloured card. Design and Technology was fun!



The following week she was able to cut out the net and assemble it with plastic mirrors to make a fully working Periscope. Sally's group had great fun at break 'experimenting' with them and later discussed how they might be developed further. How could they be improved, a swivel neck perhaps or made to extend like a telescope? Could they be redesigned, using different materials, to enable them to see underwater wildlife in the school pond?

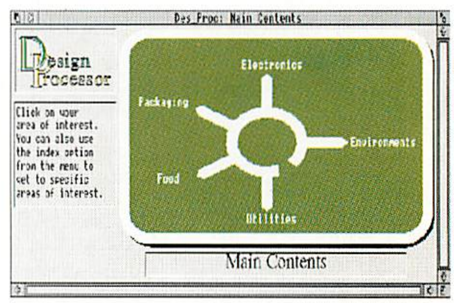
The story is fictional, but based on real experiences of real children using Design Processor for the first time. The Women Into Science and Engineering project (WISE) now has Design Processor activities on two of its fleet of vehicles. During trials in North Yorkshire, hundreds of year 8 and year 9 girls were able to design small products within a single lesson and produce a card plot-out to take away with them so that they could make them.

Applications

But what is Design Processor? At one level it comprises a suite of eleven RISC OS applications including some well known CAD and Design and Technology software - WorraCAD, Oak PCB and Euclid for example. Each of these are contained within Design Processor on full site licence. The complete Design Processor system requires a computer with a hard disc and a minimum of 2Mb of memory but a built-in utility enables any one of these programs to be copied on to the user's own floppy disc so that design work can be continued on any Archimedes within the establishment.

But that's not all! One of the applications is the universally popular Genesis. Using this as a basis, a comprehensive database for Design and Technology is being built up by users of the system. These are mainly classroom practitioners and this work is being orchestrated by the National Association of Advisers and Inspectors in Design and Technology in the East Midlands and Yorkshire region.

The Database contains two main types of data. Information Pages enable pupils to browse around their chosen topic: to find out about the history of Zoetropes, how to use Ohm's Law in potential divider calculations or what a lacto-vegetarian is allowed to eat for example. Object Pages are the working heart of the system. These contain text information and representations in a variety of file formats of a wide and expanding range of Design and Technology items: electronics components, packaging nets, kitchen units, and food items to date.



All data items can be readily accessed by following a familiar road signs system or, more directly, by using Design Processor's Index. At any time, all screen information can be output to a variety of RISC OS printers and plotters or saved to the user's own disc for use in Project Reports for example.

Outputs

Design Processor also contains DrawPrint and DrawPlot. DrawPrint will 'talk' to your own printer driver and allow you to scale, select landscape or portrait format, preview and, most importantly, enable large images to be printed - a 'tiling' technique is used which prints out multiple sheets

in the Classroom

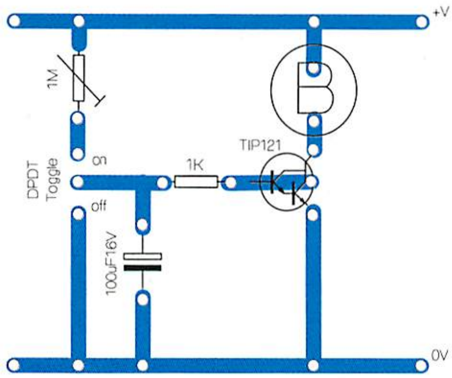
of paper complete with crop marks to allow alignment. Full size patterns for clothing designs, boat hulls, or wallpaper could be printed out in this way.

DrawPlot will output anything held in a DrawFile, including outline fonts and sprites. The output can be sent not only to Plotters but to other devices which accept HPGL commands - Cutter/ Plotters or Engravers for example.

Translation

It is Object Pages which provide Design Processor with its real power. The Genesis type links are arranged in such a way that simply dragging an object on to an application will cause the object to be displayed in a file format appropriate to that application - automatically! A consequence of this is that Design Processor can translate 2D kitchen designs into 3D, or circuit diagrams into PCB layouts, for example, by automatically substituting different file formats held on the relevant Object Page. This is done entirely transparently. All the user has to do is to select the Translation required - Design Processor does the rest!

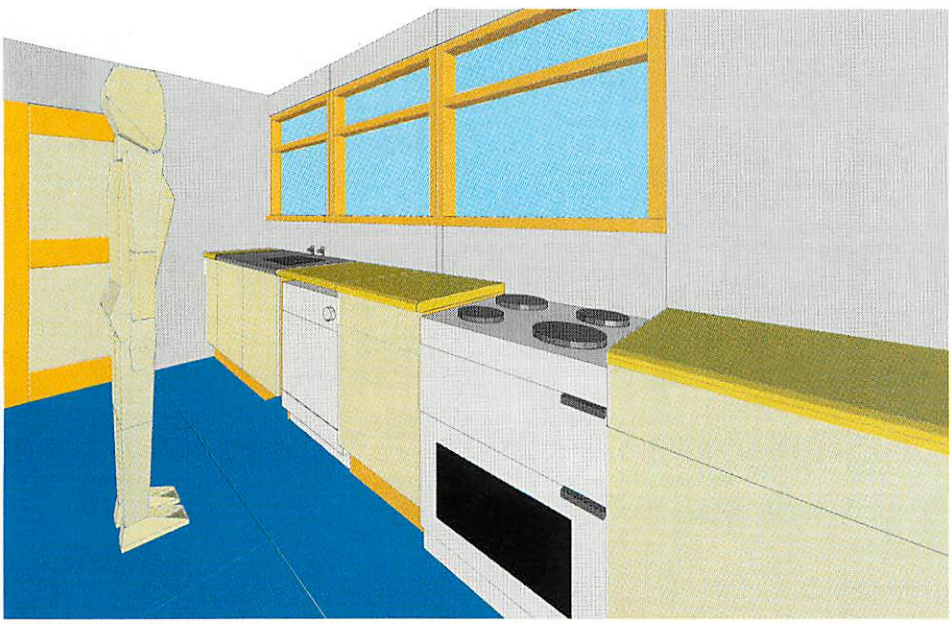
Once an Object is loaded into an Application, or Editor, it can be modified. Other Objects can be added, parts deleted or new parts created by using



the Tools available in the editors. At any time, a pupil can interrogate the Database to find out more about the Objects being used. At the end of a lesson, pupils can save their work to disc and use the built-in Bookmark facility to record exactly where they are in the system. The next time they use Design Processor, it can be restarted using the Bookmark file to enable them to continue from where they left off.

Projects

And there's more! It is clear that a system as comprehensive as Design Processor requires very accessible entry points to enable children quickly to benefit from using it. For this reason a series of Projects is being developed for each of the main sections. The Packaging section contains other projects made from Folded Card, such as optical



toys and musical instruments. Electronics includes introductory projects, some of them exploiting self-adhesive copper tape as the circuit building technique.

Each of the Projects is supported with comprehensive Project Notes which enable children to quickly become familiar with Design Processor with minimum teacher intervention required. These are tightly structured to give children success, confidence and enjoyment - just like Sally and Daniel! As children progress through the school they will discover more and more aspects of Design Processor to support their Design and Technology including, of course, completely content free applications when that is what is required.

What next?

And for the future? Design Processor is growing continuously as more and more users contribute ideas. It is for this reason that purchasers will receive free updates for 3 years after the date of purchase! Current developments include Textiles, House Interiors, Supermarkets and Shops, Parks and Gardens, Streetscapes, Structures and Mechanisms.

A link with Boxford machine tools has led to a Database of turned components being constructed. Using Design Processor, pupils will simply select a component, a flanged bush for example, modify its sizes to suit their own requirements and then drag a file on to a Boxford CNC Lathe icon. Design Processor does the rest, including a print out of G Codes if you really want them!

Users are encouraged to comment, criticise and contribute new ideas to the system, helping to ensure that Design Processor develops to cover an ever broadening range of Design and Technology activity.

A Design Processor site licence costs £900. This can be paid for over three years if required, and includes updates to the system for a three year period.

Oak Solutions and the Curriculum

	English	Modern Languages	Geography	History	Mathematics	Technology	Science	Art	Music	Key Stage
Oak Recorder	✓	✓	✓	✓		✓	✓		✓	All
CAD										
Design Processor	✓				✓	✓	✓	✓	✓	3/4+
Parametric Design Tool					✓	✓	✓			3/4+
WorraCAD					✓	✓				3/4+
KiddiCAD					✓	✓				2/3
Oak PCB						✓	✓			3/4+
Oak Logic					✓	✓	✓			3/4
ANIMATION										
Euclid					✓	✓	✓	✓		3/4+
Mogul					✓	✓	✓	✓		3/4+
Splice					✓	✓	✓	✓		3/4+
Tween					✓	✓	✓	✓		2/4+
Arclight					✓	✓	✓	✓		3/4+
MULTIMEDIA AUTHORING										
Genesis	✓	✓	✓	✓	✓	✓	✓	✓	✓	All
GENESIS APPLICATIONS										
CD Français		✓				✓				3/4
Ancient Egypt	✓			✓		✓		✓		2/3
Saxon Life	✓			✓		✓		✓		2/3
Viking Invaders	✓			✓		✓		✓		2/3
Castle Life	✓			✓		✓		✓		3/4
Cistercian Abbeys	✓		✓	✓		✓		✓	✓	3/4
Investigating Local Industry	✓		✓	✓	✓	✓	✓			3/4+
Battle of the Somme	✓		✓	✓		✓			✓	3/4+
Primary Nature Pack	✓		✓		✓	✓	✓	✓		2/3
Letters	✓					✓		✓		1/2

OAK SOLUTIONS



HANDS ON

Practical advice and techniques for your machine

THIS MONTH:

- The ultimate mode changer
- 3D programming
- Questions and answers
- Star Info
- Hints and tips
- Program listings
- Book reviews: Wimp programming

A new dimension

Continuing our 3D tutorial, Dave Acton shows you how to build the polygons that make up your images, how to build them quickly and how to give them realistic shading

Last month was an introduction to 3D graphics. Our task now is to get maximum processing speed from 32-bit machines and produce 3D images quickly enough for real-time applications.

So, our attention returns to converting 2D. Having turned 3D world co-ordinates into 2D screen ones we want to plot the polygons as fast as we can.

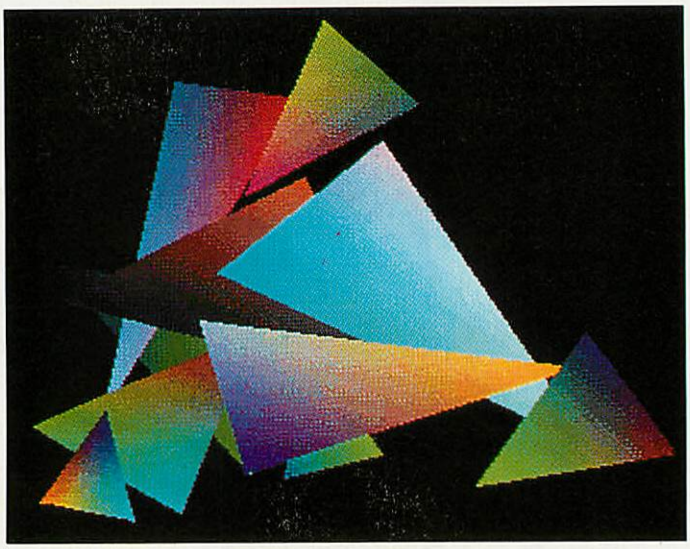
Polygons are drawn by plotting (or calculating) the perimeter, then filling the interior. So, before we look at ways of plotting filled polygons, we must consider how to plot a line on the screen.

Consider line AB. Starting at A, we plot a point, increase the *x* and *y* co-ordinates by amounts appropriate to the gradient of the line, plot another point and continue until we reach B. One problem is we might leave gaps. For this reason, line plotting generally involves two loops: one for steep lines (more than 45°) and one for shallow. For steep lines, we start at A and plot a series of points, each time adding 1 to the *y* co-ordinate and a value (less than 1) to *x*.

For shallow lines, we start at A, but increase *x* by 1 each step and *y* by less than 1. This way we are sure to avoid gaps.

However, as we are limited by the screen resolution, we must be sure, when we plot a point, it is the closest approximation. Some 'intelligent' rounding may be required.

Fortunately, the Bresenham line-plotting algorithm not only produces an accurate line but does so using integer values only. It is therefore ideal for fast graphics and has become the definitive algorithm. Our 3D module uses this technique.



Gouraud shading put to the test

To see a line approximated on-screen, run *Bres*. This plots a small line segment which can be moved with the mouse. It shows a zoomed view and the 'true' line being followed.

PLOTTING POLYGONS

The simplest polygon is a triangle, so look at the figure opposite for a suitable candidate. Our first consideration is to trace the three lines forming the perimeter. First though, we need to find the maximum and minimum *y* co-ordinates, at B and A respectively.

We begin at A. Using Bresenham's algorithm, we trace a path up to B. For each y co-ordinate along the way we record the *x* co-ordinate in a table. This table contains two values for each *y* co-ordinate. These represent the start and end of the filled area defined. It doesn't matter which side we go up first – when we come to filling each pixel row, we can swap the end points over if they are the wrong way round.

When we reach B we notice that our *y* co-ordinate has reached the maximum possible value. We therefore swap sides and record all future *x* co-ordinates in the other slot of our table. When we have finished, the start and end points for each *y* co-ordinate will have been filled in.

Carrying on from B we trace down to C and then from C to A whereupon we realise we've finished. Now, using the table we've created, we fill each line from the minimum to maximum *y* values using the fastest line-fill routine we can write.

THE BAU3D MODULE

I have written the source in modular fashion, so the module provides its facilities in the form of new SWI calls such as *BAU3D_Plot*. The source for each SWI is saved as a separate Basic program in subdirectory *Source*. There are three listings to enter : *BAU3DSrce*, *Source.SWI00* and *Source.Version*. You must create *Source* and save these last two inside. To assemble the module *BAU3D* run *BAU3DSrce*. If you are not a machine code fan, skip to the examples below.

BAU3DSrce scans the *Source* directory for a Basic program: *Version*. This returns the current version number of the module. It also looks for programs called *SWIxx*; any found will be incorporated in the main program using the OVERLAY command.

A source file contains three functions; look at *SWI00* as an example. *FNswi00_name* returns the name of the SWI being assembled, *Plot* in this case. *FNswi00_vars* defines variables the SWI will need, for which space must be allocated from the RMA. Finally, *FNswi00_code* assembles the code for the SWI itself.

The reason the module is assembled like this is to allow easy addition of new calls and updates of existing ones. Next month we will add calls to render 3D objects using the polygon-plotting routines defined here. Using the *BAU3D* module as it is now, just one call is supported:

```
SYS "BAU3D_Plot",sides,
list,colour,flags
```

- sides is the number of sides of the polygon being plotted. It should be between 3 and 256.
- list is the address of a list of co-ordinates. Each vertex of the polygon is stored as two four-byte values. These are the *x* and *y* co-ordinates (using normal OS units).
- colour is the colour to be

used in plotting. Its value depends on the settings of flags.

● flags contains bits which may be set or clear to specify how the polygon is plotted. Currently only bits 0 to 2 are used; the rest are reserved and should be set to zero.

Bits 0 and 1 contain the colour type and determine how colour should be interpreted. The possible values are:

0: colour contains a colour number, a value suitable for poking directly on the screen.

1: colour contains a GCOL value. For 256-colour modes, GCOL is in the top six bits, the TINT in the bottom two.

2: colour is in the form &BBGGRRXX and specifies colour to be used in terms of red, green and blue components. *ColourTrans* will convert this to real colour.

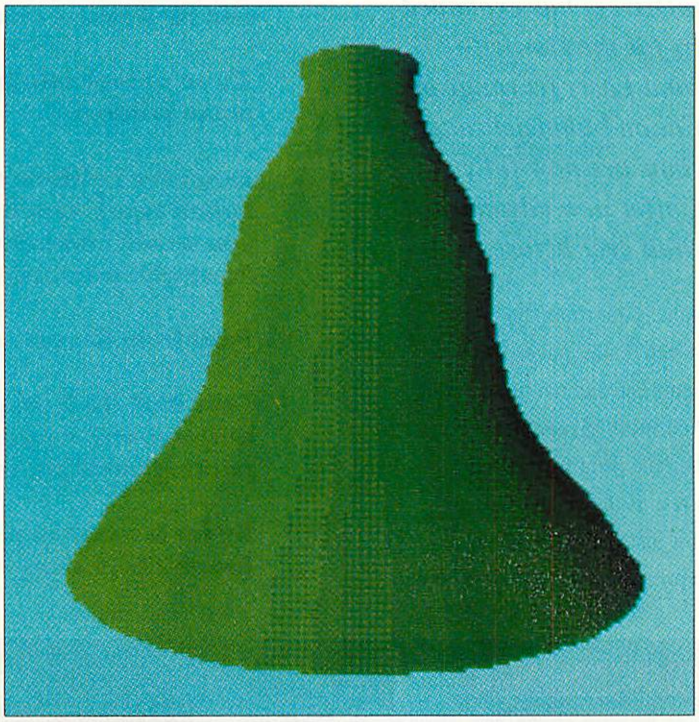
3: no colour is used. If bit 2 is set (see below) the current GCOL setting will apply.

Bit 2, when clear, means the polygon is plotted using our own fast routine which pokes values direct onto the screen. If bit 2 is set, operating system calls (namely PLOT 85 to plot a triangle) are used. This is because owners of special graphics hardware (24-bit colour boards) may need OS calls for the *BAU3D* module to work with their hardware.

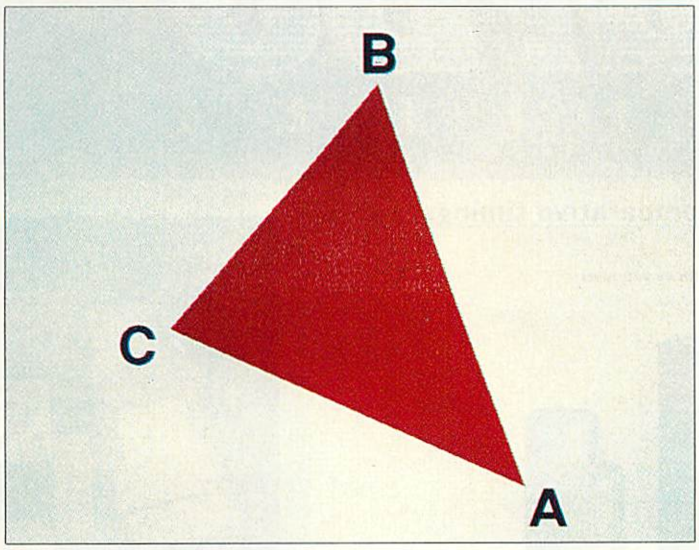
First, run *PolyDemo*, having installed the module with *RMLOAD BAU3D. This short demo plots polygons (50 times each) for a selection of screen modes. The later ones are only available if you have a suitable multisync monitor. Both fast and OS plotting are used and the two times are shown.

The difference in times can be quite large, not only because of the efficiency of our routine but the overheads of plotting many-sided shapes as a set of triangles with the OS bit set. Our fast routine copes with any number of sides up to 256 providing the polygon is convex (no exterior angle greater than 180°).

Replace procedure PROCplayback from June's *3DProcs* listings with the one on this month's yellow pages. Run *3DDemo2* and press RETURN at playback stage to toggle between fast and OS plotting. If you're feeling adventurous, why not rewrite *3DDemo2* so objects are stored as they are (not broken into triangles). This uses the "BAU3D_Plot" call and speeds everything up.



Easy light shading using the Risc OS 3 ColourTrans module



Our example triangle for the fast plotting routine

SHADING

Plotting needs to be fast for real-time graphics, but equally important is shading: colouring the polygons to produce as realistic an image as possible. Shading algorithms run from simple to highly complex. Raytracing programs which take hours to produce a single frame often use complex shading algorithms. Several light sources might be present, and different surfaces and textures need consideration.

Such maths is too time-consuming for real-time 3D graphics on a modest 32-bit micro. However, simple shading, using one light source, is within our grasp. The very simple listing *Vase* shows the idea, plotting a random vessel illuminated from the side.

The vase's side is made of *ang_step* vertical sections. The angle of each is noted and the brightness of a section related to the cosine of that angle. The new *ColourTrans* module of Risc OS 3 dithers colours and provides more shades. Very effective given the limited number of faces and simplicity of the algorithm.

As we will see, illuminating a 3D world from a given light source is hardly more complicated. Consider a light source, then take polygon ABC. Using algebra, work out the normal to the polygon, a line of length 1 perpendicular to ABC.

Now find the angle between the normal and the direction of the light. This can be converted into a brightness value, using COS. as in *Vase*. Background lighting is taken into consideration by adding a value to the brightness. The brightness is combined with the colour of the object and the closest colour picked (using *ColourTrans* or similar) for use on-screen.

GOURAUD SHADING

Gouraud shading dramatically improves 3D image quality. Until now we have assumed each polygon is of a constant shade. Gouraud shading involves calculating the true colour at each corner of a polygon, then using interpolation to fill the shape so colours run into each other smoothly.

Run *Gouraud* and enter 0 when asked for 'type of error correction'. First a triangle with red, green and blue corners is plotted. Press a key and randomly-shaded triangles will be shown. You see the interpolation working, but also the limited number of colours.

We need to introduce some form of error correction or 'error spreading'. This means choosing the nearest colour for each point, then noting how far the colour is out and adjusting the colours of adjacent pixels to compensate. If you type '1' into *Gouraud*, the *ColourTrans* module's dithering option will then be used, and this will provide you with a perfectly acceptable improvement.

Type '2' for simple error spreading. Each error is passed to the pixel to the right. The results are better still. Finally, a method called Floyd-Steinberg Integration (as used by *ChangeFSI* – hence the FSI suffix) will produce an even better result by spreading the error to the right and to the pixels above.

You should also bear in mind that the example we have used is in Basic, therefore it is a bit slow. Also, Gouraud would generally be used for evening out small discrepancies and the red, green, blue test is a bit unfair.



QUESTIONS AND ANSWERS

Q Where can I find a current list of Master 512-compatible PC software?

N Perry
Buxton

A **Given the absolutely vast catalogue of PC-compatible software available, it's somewhat ambitious to sort through it and find all of the stuff that runs on the Master 512.**

Fortunately, there is someone, in the public domain world at least, who has taken on the challenge. Alan Blundell of BBC PD has been ploughing his way through IBM shareware for some time now, finding nice programs that work on 512s and Arcs.

Last time I heard from him, he had about 20Mb of software available. For a current catalogue, send an A5 stamped addressed envelope to: BBC PD, 18 Carlton Close, Blackrod, Bolton BL6.

Q After reading the article on extra disc drives (*Acorn User* February), I was still unsure exactly what hardware and software I would need to upgrade my A3000 with a second 3.5in drive (either high density or normal). Can you help?

Gareth Stephenson
Redditch, Worcs

A **Unlike 5.25in units, most 3.5in normal (800K double density) drives don't need any buffering hardware.**

So, all you need is a self-powered external drive and a ribbon cable with two parallel connectors at one end. These link the A3000's circuit board with your existing internal drive, while a connector at the far end of the cable joins them to the external unit.

The circuit board on each drive will have links or switches which you then need to set so that your computer can distinguish drive 0 from drive 1.

For a high density (2Mb) drive, you must first upgrade to Risc OS 3, if you haven't already done so, but that's not enough on its own. Although the operating systems is capable of reading 2HC discs, the disc controller in your A3000 is just not up to it. The only current solution was the Alpha HDI podule from Arxe Systems, on 081-534 1198, costing £159 exc VAT.

Arxe Systems may not be staying in the Acorn market (see the News pages).

However, other third party suppliers hope to release high density floppy systems in the near future. Risc Developments is among those working on such a system.

For more details on this subject, get a copy of *Application Note 208: Adding External Floppy Discs* from Acorn Customer Services, Fulbourn Road, Cherry Hinton, Cambridge, CB1 4JN.



Star question

Q I recently became reacquainted with my old friend, the Acorn Electron, which has lain dormant for some years but is still working well. I only ever used it for basic programming (no pun intended) and for playing games, which I dearly loved.

As many of my programs have been corrupted due to bad storage, I was wondering if you could tell me of any companies who still produce or stock software for the Electron. I know that Superior still has some excellent titles but surely there must be others out there as well.

J Glithero
Canterbury

A The Acorn Electron still has a healthy following and a few people are still selling software for it. Apart from Superior Software who as you say produce software for all eight-bit machines (0652) 65858, there's Software Bargains & Mercury Games in Leeds (0532) 436300; Electron PD, 5 Edward Street, Clifton, Brighouse, West Yorks., HD6 1DA and HeadFirst PD, 97 Chester Road, Southport, PR6 7HH. For general help and to get advice from other Electron users, you can also try contacting The Electron User Group, 134 Great Knightleys, Basildon, Essex, SS15 5HQ.

Q I have started using assembler on my BBC B+ to get the extra speed needed for games, but I find it very tedious to use. What are the advantages of assembler as opposed to compiled Basic, apart from cost?

Edward Ross
Cheltenham

A **The actual differences between compilers and assemblers are many and subtle, so let's start by looking at the advantages of compilers over interpreted languages like BBC Basic. When an interpreter encounters a command like PRINT, it looks it up in a dictionary, checks it for errors, then calls up the relevant bit of machine code. Once it has gone through this palaver, it executes the instruction. Then the interpreter goes back to the program, reads the next command and so on *ad nauseam*.**

Compilers do all this interpretation first. This creates a second file containing a sequence of user-unintelligible calls to machine code functions stored in library files. In Basic compilers the library may, in reality, be the BBC Basic routines stored in Rom. Many compilers also use a third stage which produces a run-time file which contains executable machine code. When you compile source code, much tedious waiting is consigned to the production process and the final program runs faster.

It is obvious that compiled code goes faster than its interpreted equivalent. How fast it goes compared to pre-assembled code depends on the flexibility of the source language and the efficiency of the compiler.

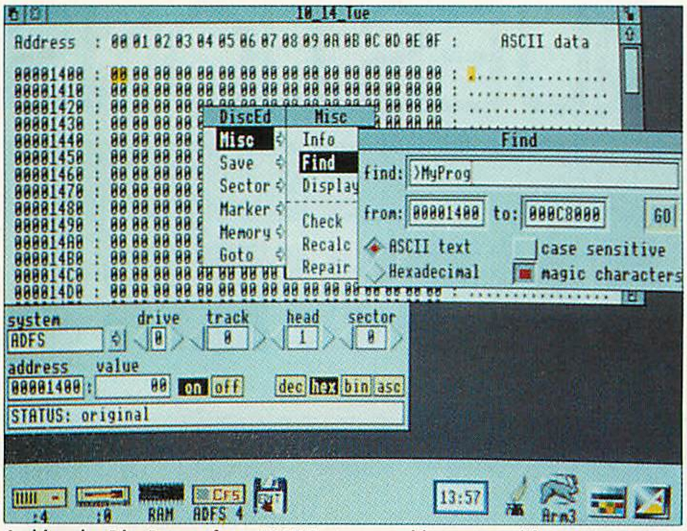
Take, for example, the BASIC command LET X% = 2*X%. A compiler might pass this statement to a generalized routine, integer multiplication, which would take a dozen or so clock cycles to run. A competent programmer writing the same instruction in assembler would immediately spot it as a case of 'integer doubling' which, if X% was small, could

be executed by a single, shift instruction taking one cycle. One reason C is so popular is that low-level operations of this sort can be specified within the source code in order to maximise efficiency at run time.

The example is fairly trivial and could be spotted by a well written optimising compiler but it illustrates the point. Unless the source language is, itself, capable of describing low-level commands efficiently, the general nature of compiling can often introduce significant time delays to the process.

BBC Basic is rather long-winded when imitating machine code, so suffers a lot from this problem when compiled. To make things worse, these delays are most prevalent in speed-critical sections of games programs – things like screen scrolling and sprite manipulation.

My advice is this. Compile your Basic to speed up the overall running efficiency of your program but use a compiler that will link to chunks of assembled code. Then, simply write the fastest bits in assembler.



Archimedes Disc Rescue from LOOKSystems could save your life

Q Help! I own an A3000 with RISC OS 3.1 and hard drive. I have a problem concerning a corrupt file which I simply *cannot* delete from my hard disc. The file started out as a small spreadsheet in *Pipedream* but, when I updated it one day, it decided to pick up parts of other files which had been on the hard disc and were subsequently deleted.

Although I can edit this file, any attempt to save or delete it causes the computer to freeze up. I've had similar problems with a couple of *Ovation* files but I succeeded in saving edited versions and then deleting them in the normal fashion. My rogue spreadsheet, however, continues stubbornly to occupy 63K of my precious hard disc. How can I get rid of it and why did it happen in the first place?

Martin Cheeseman
Watford

A This is probably due to a corrupt disc map, This could be due to power loss while saving, spikes in the mains or radio frequency interference.

A possible solution would be to edit the file from your hard disc using Archimedes Disc Rescue, from LOOK-Systems on (0603) 764114. Backup on to floppies, reformat your hard disc and reinstall your work. Then consult a hardware person about electrical interference.

Q I have an A3010 with 2Mb Ram and the *Armadeus* software.

Can I connect the digital output of a CD player to my Arc and sample sound using Armadeus? I do not have the sampler board.

Scott Boham
Romsey

A To do this you would need an optical or SPDIF interface to load data direct from the player to your computer's Ram and edit it in software.

Nobody makes such a device for the Arc. This is not surprising really since, if it were possible, the most data you could store on a 3010 would be 12 seconds.

Customer hotline

Each month in Acorn User, Alan Glover offers you the latest support and advice from the Acorn customer service department

This month we bring you the latest Acorn advice on speedy networking to a checklist for a hard disc drive.

FASTER LOADING ON NETWORKS
Carefully structuring directories and Armboot files can make a big difference to how long it takes for a class-full of machines to start up and load applications. But loading a large application to fifteen or so stations can take two minutes or more, even on AUN Ethernet. This can be frustrating, but there are solutions. One is *AppFS*, a fast, lightweight server which reduces loading time by a factor of around four.

This read-only network filing system works over Econet, as well as AUN Ethernet, and can dramatically boost network performance by reducing the number of small network transactions that take place when applications are started. It also reads data across the network in larger chunks; this suits Ethernet. It can co-exist on the same machine as a Level 4 fileserver, but needs a separate read-only disc or partition. *AppFS* is available from AngelSoft on (0554) 776845.

CHECKLIST
Following last month's reminder about the batteries in some Archimedes models, here are some further periodic checks worth making. So, when did you last...

CHECK HOW MUCH FREE SPACE IS LEFT ON YOUR HARD DISC?
Running out of space can be very frustrating (and can even result in the loss of the file you were trying to save if the program saving it cannot cope). Ask yourself whether the things on the hard disc are used often enough to preclude having them on a floppy, or whether you could equally easily move them to a floppy without affecting the usefulness of the system. Another solution is to add another hard disc. However, there are limits on how many extra hard discs can be added to various interfaces (IDE or ST506, one extra hard disc; while with SCSI, three extra hard discs).

HAVE THE FAN FILTER CHECKED/CHANGED?
A blocked filter will reduce airflow through the computer, leading to an increase in temperature inside the case and (in extreme cases) a greater chance of failure at some point in the future.

BACKUP YOUR IMPORTANT DATA?
Hours of work can be lost if an error develops on a floppy, or a hard disc fails. Again, this is a thing that tends only to get done when it is too late. The older the hard disc, the more important this becomes: hard discs will eventually wear out.

CHECK YOUR SYSTEM IS FREE OF VIRUSES?
A virus loose on a system can result in anything from impaired performance to spurious errors and data loss/destruction. There are now over 40 families of virus.

ADVANCE SPREADSHEET
When creating a spreadsheet you may see the message 'too many items in a menu'. If this occurs you should reduce the number of fonts available to *Advance*.

Hints and tips

Technical trickery and useful tips from your fellow readers

Welcome to Hints and Tips. If you have any of your own tricks to share, please send them in to us at: Hints and Tips, *BBC Acorn User*, 101 Bayham Street, London NW1 0AG.

DIY OBLIQUE FONTS

Stephen Parkin

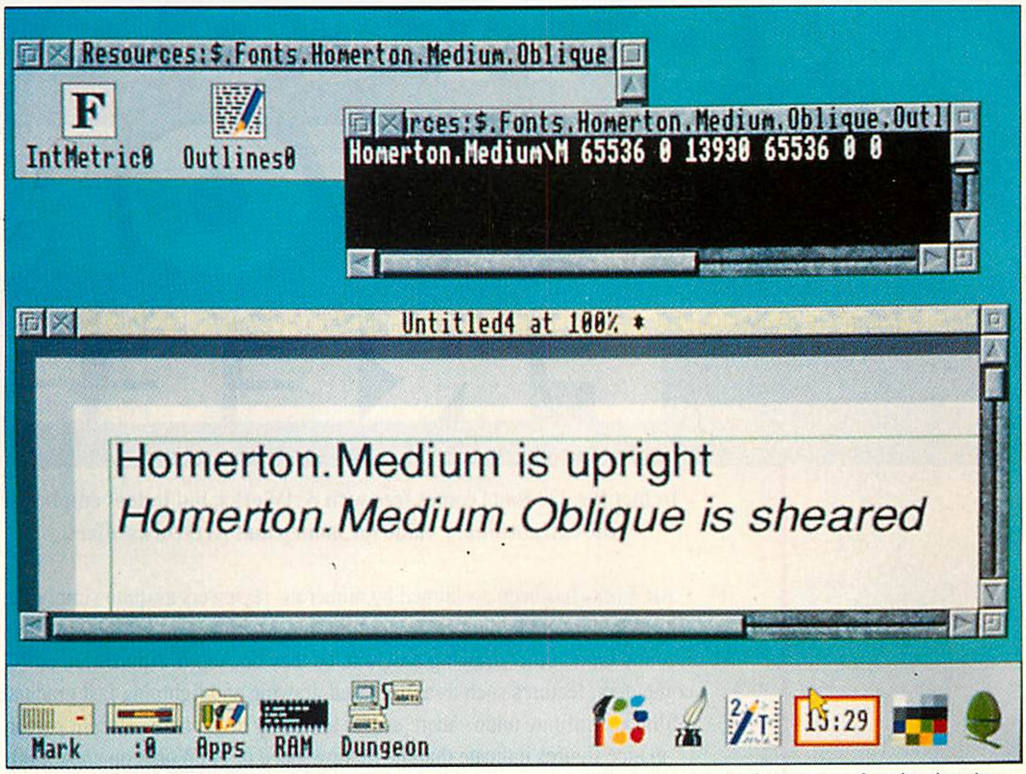
With the advent of Risc OS 3 it has become very simple to make an oblique (not italic) version of any font. The following method is used by Acorn for its Homerton and Corpus fonts in Rom.

Simply open the directory of the font you wish to process, and create a new directory inside named *Oblique*. Into this directory, copy the IntMetrics from the parent, and load this file into *Edit*.

Set overtype mode by pressing SHIFT-F1, and add `.Oblique` to the end of the font name at the start of the file, by typing over the [00] characters after the font name.

Next choose Open '$' from the Apps iconbar menu. Go into *Fonts.Homerton.Medium. Oblique* and load the text file *Outlines0* into *Edit*. Change the words Homerton.Medium to the name of the font you are processing, and save the file as *Outlines* along with the *IntMetrics* file you have just edited. The new font is now complete: run your fonts folder and it should be available.

The six numbers in the *Outlines* file operate on the parent font as follows: width, rotation, italic angle (shear), height, horizontal offset and vertical offset.



Homerton.Medium.Oblique is not a true italic font, but is generated from the standard Homerton font by shearing

CONTROL BOOT FILES

Neil Carson

If, like me, you have a directory containing a number of applications and *Impression* documents, opening it the first time can be a lengthy business; this is because the boot file has to be run for each application.

This delay can be annoying. However, there is a new feature in Risc OS 3 which allows you to avoid this delay: simply hold down CTRL when you double-click on the directory and no boot files will be run.

This has the side effect of displaying the applications with the normal Archimedes 'A' application icon rather than, say, the pen and ink pot for *Edit*, as the boot file has not been able to load the relevant sprite file. This can be fixed by opening the directory without holding down CTRL.

BACKGROUND PRINTER

E Kelly

You *can* achieve background printing on Risc OS 3 for all print operations, contrary to popular belief, but it entails a rather contrived process.

The idea is to create two printers on the iconbar: one prints to a file, the other prints that file. Printing files directly always multi-tasks, so background printing is achieved. Follow these steps:

1 Load the printer manager, and then bring up the Printer control window.

2 Drag the printer definition file for your printer into this window again, so two similar printers appear in the window.

3 Make the second printer active by clicking Menu over the entry in the control window and choosing Active.

4 Rename the second printer as *File* by using the Configure dialogue box.

5 Set up the *File* printer to print to a file via the Connection dialogue box.

When you print a document, make sure the *File* printer is active (by clicking on it). A printout file will be created; rename this uniquely.

When you have printed all the documents you wish, you will have a set of printout files which have been created by the *File* printer. To print these in the background, click on the first printer icon and drag the files to it. The files will appear in the queue and you can continue to use your computer.

Although this is not true background printing – you still have to wait while applications create printout files – it is a lot quicker than hanging up the machine with a printing job. It also lets you chart the progress of the print by monitoring, in the queue window, what percentage of your work is done.

FLOPPY SWAPS & 1MB

John Knowles

With a Risc OS 2 A3000 with no hard disc, there can be a lot of time-consuming disc swapping. Much of this swapping can be avoided, simply by including the following three lines at the end of your *!System.!Run* file:

```
RMEnsure SharedCLibrary 0 RMLoad System:Modules.CLib
RMEnsure FPEmulator 0 RMLoad System:Modules.FPEmulator
RMEnsure ColourTrans 0 RMLoad System:Modules.Colours
```

When you double-click on your system folder, these three modules are loaded automatically, reducing disc swapping. Another time-saver is to set the Next slot in the Task manager to 800K before backing up your disc. Backup needs just one disc swap.

To free more memory on a 1Mb machine, the following modules can be unplugged if you don't have Econet: *Econet*, *NetFS*, *BBCEconet*, *NetFiler* and *NetStatus*.

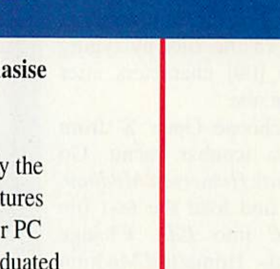
220 OUTLINE FONTS £169 AND A COPY OF ARTWORKS FREE!

In fact the 220 fonts comes free with ArtWorks, but it does emphasise the extraordinary value for money that ArtWorks offers.

ArtWorks has been acclaimed by numerous reviewers as quite simply the best drawing and graphics program for the Archimedes. It offers features found on no other drawing program, be they on Acorn, Apple Mac or PC computers; features such as anti-aliased drawing and lightning fast graduated fills, and infinite undo - there are far too many to list here. Recent performance figures indicate that the redraw speed of ArtWorks on an A5000 computer is as fast as an Intel Pentium based 64-bit PC - and around three to four times faster than the fastest 486 based machines.

Art Works

ArtWorks is not only fast, but also easier to use than the alternatives, which makes it suitable for all drawing and illustration work, no matter how simple. Yet it also provides professional illustration tools, such as full colour separations, overprint control, CorelDraw, Freehand and Illustrator file compatibility, amongst many others.



And finally we offer a no quibble money back guarantee. Buy it, and try it - you have nothing to lose, and a great deal to gain.

ArtWorks £169 +VAT (£198.57 incl.)

Computer Concepts Ltd

GADDESDEN PLACE, HEMEL HEMPSTEAD, HERTS. HP2 6EX

TELEPHONE: 0442 63933 FAX: 0442 231632

Strictly for wimps

Want to get to grips with Wimp programming? Fin Fahey looks at two approaches that will start you off but may leave you demanding more

There is no doubt about it; writing an application that makes use of the Risc OS Wimp can be a tricky business. Not only do you have to contend with co-operative multi-tasking, window and menu management have to be dealt with as well. And then there is your code...

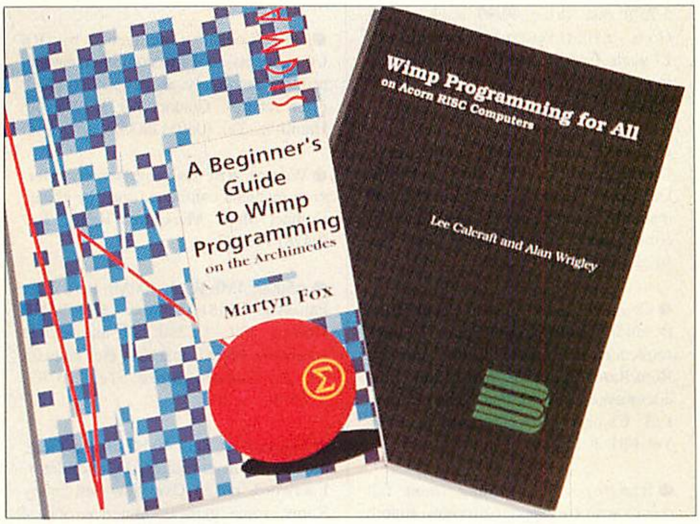
Anyone wanting to get to grips with Wimp programming could always purchase the official *Programmers Reference Manuals*. At around £99 for the new Risc OS 3 version, this set of manuals will provide you with all the information you'll ever need, but the price could well put off the casual coder, especially as only one section deals with Wimp programming itself.

Two new books attempt to fill the need for an introduction to Wimp programming without breaking the bank. *Wimp Programming for All* (Lee Calcraft and Alan Wrigley), and *A Beginner's Guide to Wimp Programming* (Martyn Fox) assume a basic knowledge of BBC Basic and take it from there, right up to a full (but not necessarily good) application at the end of each of the books.

Both titles were produced on Arcs: and it's noticeable too. Each contains a liberal smattering of diagrams, screenshots, tables and examples of code. That's the good part.

The bad part is that they both suffer the inevitable ailments of in-house publishing; the layout in both titles is definitely a bit iffey in places. Criticism to one side, the benefits of crisp screen dumps, and error-free examples of code are to be appreciated.

Machine code programmers, and those who code in C will, to an extent, feel left out. Both titles use BBC Basic (and its intricacies) to present new concepts, and on the whole it works. Since the Arc is equipped with Basic for free, the decision to use Basic is logical, as the books are aimed at budget programmers.



ROBERT CLIFFORD

However, examples of code with multiple statements per line and spaces removed are small in size but do nothing for readability, and the offering from Fox suffers most from this. C programs, on the other hand, do not suffer from the intricacies of setting up parameter blocks, but then again you have to pay at least £90 for a C development system.

So what's on offer? Well, both titles cover the basics one would expect, opening windows, icons, menus and suchlike, but that's about where the similarity ends.

In the preface to his offering, Fox explains that he wrote the book as a series of articles to teach his son about Wimp programming. Of course, a beginner will not mind the simple, easy-to-read explanations that are presented. What got up my nose was the use of overly simple language in explaining concepts that a child would not have too much trouble grasping. Annoying to the point where you grip the book and grind your teeth muttering 'get on with it'.

Opening a window, defining menus, dialogue boxes and more are covered, but not in much detail. It's tricky to explain something in writing without getting bogged down in too much detail. Fox has managed to avoid that pitfall with great success, perhaps a little too well.

What Fox does explain he does well, but what he leaves out is quite a lot of detail. After discussing the subject of drawing shapes in Chapter 11, Fox tackles the grey area of saving and loading from the Wimp, and sneaks in a lot about Wimp messages. He covers the subject well, but upon reaching the end of the book I wondered where the rest was. This is definitely a beginner's beginners' guide, so be prepared to invest in some further reading.

Messrs Calcraft and Wrigley don't mess with namby-pamby explanations though. Facts are presented, one after the other in a logical manner. Anyone familiar with *Risc User* will recognise the dry, humourless 'style'. In fact, anyone familiar with *Risc User* will be broadly familiar with the content too, as the book is a revamp of a series of articles written by Calcraft for said publication.

The 192 pages are crammed with useful info that, in some places, goes into considerable detail. The authors have drawn on their own experiences of programming the Wimp, the chapter on redrawing windows being one good example. The authors not only tell the reader 'how to', but give guidance on how to do things efficiently. Not at all the same thing.

The surprise is the last chapter: *Printer Drivers and Outline Fonts*. It came as a surprise as it gives a good insight into how these complex beasts work, yet the book (like Fox's offering) gives precious little information on bashing text on to the screen using the font manager.

Both books have their good points, but the Risc Developments one is probably more comprehensive, with the Sigma book being aimed at a very basic level.

Product details

Title: A Beginners' Guide to Wimp Programming
Author: Martyn Fox
Publisher: Sigma Press
(ISBN: 1-85058-336-6)
Price: £12.95

Title: Wimp Programming for All (on Acorn RISC Computers)
Authors: Lee Calcraft and Alan Wrigley
Publisher: Risc Developments
(ISBN: 1-85142-088-6)
Price: £12.95



FREE ADS

● Techno 1 Video digitiser – £150, Wild Vision Genlock (C82) – £150. Contact Mr J Stephenson, Cumbria. Tel: (0900) 814602

● 16-bit Scsi card, hardly used, was £150 – only £80 ono. Contact Mr M Watson, Comberton. Tel: (0223) 264242

● Panasonic KX-P1180 9-dot matrix printer, excellent condition – £60 ono, Hybrid Elite, boxed – £15. Contact Mr P Holliday, Bucks. Tel: (0753) 889275

● Euclid V2 – 3D Cad for Archimedes, brand new in original packaging – only £25. Contact Mr K Fletcher, Cambridge. Tel: (0223) 353994

● Master 128, 512K board with Dos, Gem, mouse, Interword and manuals – £230, 12in Philips green monitor – £35. Contact Mr R Young, Harrow. Tel: 081-427 4039

● Archimedes A420/1, upgraded to 4Mb memory, 40Mb hard disc, Acorn colour monitor, games, PD, all in first class condition – £900. Contact Alan, Merseyside. Tel: 051-606 0289

● Wanted urgently: Aries B20 shadow Ram board (not B32). Contact Mr F Levy, Merseyside. Tel: 051-608 5238

● Acorn colour monitor AKF12, only three years old – £80. Contact D West, Maidenhead. Tel: (0628) 29871

● BBC B+, 1770 DFS, Midwich 40/80 drive, Roms – Interword, Quest Paint, Replay, NFS, mouse 21F, light pen, software – £270. Contact Mr J Lake, Suffolk. Tel: (0502) 565568

● Deltacat joystick – £14, mouse port splitter – £10, Interdictor II – £10, Pres monitor plinth – £8, Dabhand Basic guide – £5, Genesis – £15 ono. Contact Mr N Metcalfe, Surrey. Tel: (0372) 274162

● Send discs of good PD and SAE plus 25p expenses, get more PD back! Specify type wanted (ARCFS, LFS supported). Contact Mr N Metcalfe, Peterstone, The Mead, Ashtead, Surrey.

● Archimedes 310, 4Mb Ram, 83Mb hard drive, Arm 3, PC Emulator, manuals and software – £875. Contact Mr A Maynard, Hants. Tel: (0590) 677625 evenings

● BBC B Issue 7 and disc drive, Interword, Logo and Dumpmaster. Contact A Lowden, Haywards Heath. Tel: (0444) 415286

● A3000, colour monitor, 2Mb Ram, 20Mb ST506 hard disc, Risc Os 3.10 – £650 ono. Contact Mr H Simons, Birmingham. Tel: (0562) 883972 after 4pm

● Complete Input collection, 52 issues with binders, collection of BBC handbooks, original values £70 and £50 respectively, reasonable offers please. Contact Mr C Dyer, Cirencester. Tel: (0285) 659872

● Computer Concepts Inter Sheet Rom, unused – £20, Acronsoft View Plot (disc) and View Index (disc), as new – £12. Contact Mr D Livesey, Clwyd. Tel: (0824) 702246

● Master 512 BBC/PC, duel 40/80 track disc drives, cub monitor, mouse, light pen, manuals user/tech, software BBC and PC, many extras, Roms, cartridges, joysticks etc – £550 ono. Contact Mr T Wildman, Birmingham. Tel: 021-748 2352

● Oak Scsi interface – £65, EMR midi interface – £65, Microstudio – £30, 5.25in disc drive 40/80 track – £25, Gods – £10, Dropship and Powerband – £7 each. Contact Mr T Goodley, Spalding. Tel: (0775) 761161 or (0775) 710640 evenings

● A3000 colour, 2Mb extra drive, Learning Curve, 25 discs software, Deskedit Arcscan utilities etc, all manuals, magazines, as new, delivery considered – £650. Contact Stott, Preston. Tel: (0772) 784821

● Complete midi music system, BBC B, midi interface, Sync unit, 16-track sequencer/Score writer Roms, sideways Rom/Ram, disc drive, Wordwise+, fully documented – £240, Panasonic printer – £75. Contact Mr C Thompson, Kent. Tel: 081-302 5849

● Intergrex colour printer, inset full colour with two spare cartridges, superb results on the Archimedes. Contact Mr L Mackay, Morningside. Tel: 031-447 3770

● Wanted urgently: User manual for centronics printer model 150-4, your price and particulars please. Contact Mr J Roberts, Stoke-on-Trent. Tel: (0782) 324407

● BBC B with two 40/80 track disc drives, 6502 second processor, colour monitor, Panasonic printer, HCR Rom box and Roms and manuals, games including second processor Elite – £350 ono. Contact Mr A Wilkinson, Cheshire. Tel: (0625) 874764 evenings

● A3000, 2Mb Ram and colour monitor, original application discs, good condition – £400. Contact Mr T Napier, Harrow. Tel: 081-861 4623

● Archimedes 310, 4Mb Ram, 20Mb hard drive, 5.25in interface, must sell – £950 ono. Contact P McLoughlin, Gateshead. Tel: 091-487 6061 after 5pm

● A3000 colour, 2Mb, 72Mb Scsi, hard drive, colour Digitiser, sound sampler, Rom podule, B510c with colour upgrade, Risc Os 3.1, 5.25in disc drive etc – £1500. Contact Mr C Holland, Dorset. Tel: (0202) 622123

● A3000, 2Mb, RGB stereo monitor, stand, cover, Panasonic KX-P1081 printer, manuals and a range of office and leisure software, excellent condition – £700. Contact Mr T Starling, Cambridge. Tel: (0223) 843613

● 8-pin dot matrix printer, Epson-compatible, good condition – £30, printer sharer 2x1 and Centronics lead – £30. Contact Mr G Carr, London N10. Tel: 081-883 8535

● Master 128, 65C102 co-processor, Philips mono monitor, twin 800K disc drives in Watford CDPM 800S plinth, Teletext – £400. Contact D Evans, Boston. Tel: (0205) 360400

● A3000, colour monitor, PC Emulator, stand, original boxes and manuals – £490. Contact D Bell, Eastbourne. Tel: (0323) 735841

● Data Logger (Intelligent) by RS Components hooks to computer, Scope, printer, absolutely as new, cost £550, offer secures. Contact Mr B Watson, Hamilton. Tel: (0698) 283582 after 6pm

● Wanted: Risc Os programmers reference manuals complete, must be cheap. Contact Mr T Markettos, Hants. Tel: (0428) 723387

● A5000, 4Mb Ram, 100Mb hard disc, Panasync C1381 monitor – £1395, HP Deskjet 500 – £250, all immaculate condition, boxed, manuals etc. Contact Mr N Gleeson, Stoke. Tel: (0782) 771914

● Master 512, dual 40/80 drives, Gem, mouse, Rom cartridges, PC Emulator, Interword, boxed Overview set, many Roms, some games, reference books, discs and disc box – £200. Contact W Critchley, Northants. Tel: (0933) 678053

● A3000, 2Mb, 40Mb hard drive (Watford IDE external interface with power supply unit), loads of software, Acorn registered, free discs, can arrange delivery 3 £550 ono. Contact H Rogers, Dorset. Tel: (0935) 817085

● A3000 disc drive interface and DFS reader, Beebug, used once, eight months old, excellent condition – £22. Contact Mr R Baker, Chelmsford. Tel: (0245) 256416

● Unplayed Black Angel – £20, I've heard it's great but I only have a Beeb. Contact Mr T Matthews, Cheshire. Tel: (0625) 574128 evenings and weekends

● TV modulator (HCCS), cost £47, sell for – £30, never used, still boxed, includes cable and instructions, has normal and Pal outputs. Contact M Stewart, Edinburgh. Tel: 031-332 3561

● Schema, mint condition, surplus to school requirements – £60 ono. Contact Mr P Lawrence, London W5. Tel: 081-566 2971

● Master 128, disc drive, monitor, printer, plinth, mouse, Amx Art and Pagemaker, Spellcheck – offers. Contact Mr J Candish, Wiltshire. Tel: (0722) 322977

● Please contact me if you want to exchange your Desktop Thesaurus for Quest for Gold. Just send your disc to Mr D Seelig, 243 Elliot Street, Tyldesley, Nr Manchester, M29 8DG. I can also exchange PD, please write to me with an SAE and letter stating PD preferences.

● Acorn JP150 works manual for printer plus 3.5in support disc – £10 ono. Contact Mrs P Wilcox, Hull. Tel: (0482) 212150

● Acorn 65C102 co-processor, 64K Ram – £35, Arthur to Risc Os 2 Rom upgrade kit plus Archimedes user guides – £20, both unused. Contact Mr D Livesey, Clywd. Tel: (0824) 702246

● Master compact, colour monitor, 3.5in/5.25in drives, ADFS, 1770 DFS, Modem, software, manuals – £250 ono. Contact Mr P Bowron, Coventry. Tel: (0302) 473150

● A3000, colour monitor and stand, LC10 Star printer, software magazines, boxed as new – £650 ono. Contact Mr J Withnall, Nottingham. Tel: (0602) 878755

● Master 128, Microvitec colour monitor, 40/80 dual disc drives, software, master reference manuals, excellent condition – £350 ono. Contact Mr M McGregor, London. Tel: 081-882 3899

● A305, 4Mb Acorn colour monitor, Risc Os and memory upgraded last year, original manuals and some software – £400. Contact Mr E Desai, Southport. Tel: (0704) 547631 evenings

● Acorn Electron, many extras, second processer, disc drive, View etc, send SAE to Mr D Mills, 13 Hawthorne Drive, Headworth Farm Estate, Jarrow, Tyne and Wear for details.

● Roland MT-32 multi Timbre Sound Module (midi sound box) – £150 ono. Contact Mr J Wallace, Huntingdon. Tel: (0487) 740601 evenings and weekends

● Quality Streamer tapes, used only a few times each, eight 3Mb DC600A tapes, capacity 60Mb – £12.50 each or offers. Contact Computer Department, Bruton. Tel: (0749) 813393

● Wonderful, faithful, upgradeable A3000, 4Mb, colour monitor with TV tuner, Risc Os 3.1, latest PC Emulator, loads of discs, second drive port – £850. Contact Mr A Gibbons, Southampton. Tel: (0703) 637622

● Wanted urgently: Any Archimedes computer for school pupil, will pay cash and collect. Contact C Lewis, Derby. Tel: (0332) 666710

● BBC B with 40/80 track twin disc drive, colour monitor, Mini Office II, Acorn Data Base, manuals, some games – £170. Contact A Pellizzon, Croydon. Tel: 081-777 5232

● Wanted urgently: View 3.00 User Guide, Viewsheet User Guide and Viewstore User Guide. Contact K Babey, Salisbury. Tel: (0722) 331763 evenings

● Masterbreak – £10, Interdictor – £5, many Micro user/ Archimedes World magazines and discs. Contact Mr T Gee, Near Bath. Tel: (0225) 762984

● Master 128, 3.5in/5.25in disc drives, Stop Press, games, Extra extra, mouse, Viewstore, Dumpout 3, Office Mate, 150 discs in lockable boxes – £425 ono. Contact Mr P Lond, Grimsby. Tel: (0472) 870875

● A305, 4Mb Ram, Arm 3, 100 Mb Scsi, hard disc, Philips multiscan monitor, Risc Os 3.1, Vidc enhancer, Impression II, Ansic – £1200. Contact Dr J Rosalki, London NW8. Tel: 071-722 5772

● A3000, 2Mb Ram, colour monitor, extra double disc drive, Star colour printer, manuals and lots of software, excellent condition – £925. Contact Mrs M Bishop, Cornwall. Tel: (0326) 240619 evenings

● Acorn Electron, Plus 1, over £200 of games (66 titles), two joysticks and all the leads and manuals, only £100. Contact A Clarke, Doncaster. Tel: (0302) 864171

● Wanted for BBC : disc filing system and 40/80 disc drive. Contact Mr P Kay, Clwyd. Tel: (0492) 531760

● Masterbreak – £10, Interdictor – £5, many Micro user/ Archimedes World magazines and discs. Contact Mr T Gee, Near Bath. Tel: (0225) 762984

● Archimedes 410/1, upgrade to 4Mb Ram, 20Mb hard disc, Risc Os 3, second floppy interface, lots of software, immaculate – £780. Contact Mr R Bryder, Stirlingshire. Tel: (0324) 814822

● BBC B, twin double drive, Epson RX80, green monitor, Wordwise, Comstar, Toolkit Roms, Analogue joystick, programmable Voltmace joystick, manuals, BBug magazines, host of software/games – £150. Contact Mr R Brayshay, Swindon. Tel: (0793 616302

● BBC B, DFS, View, Microvitec cub monitor, 40-track disc drive, joystick – £125. Contact Mr C Fraser, London N10. Tel: 081-883 5813

● BBC B, mono, disc, drive, printer, 6502 co-processor, ATPL board with Wordwise +, Wordease, Toolkit, software – £220, Archimedes Corruption, Fish!, Guild of Thieves, The Pawn, E-type, Ibex, Interdictor 2, Zarch – £15 each. Contact S Rawal, Barnet. Tel: 081-441 3142

● Arm 3, A3000, 2Mb serial interface – £630, unused Acorn AKF18 multisync monitor – £280, Watford Ultimum expansion unit – £90, unused 40Mb hard drive – £80, Acorn PC Emulator V1.7 – £50. Contact Mr A Hamlin, Uxbridge. Tel: (0895) 635695 weekends only

● Brother HR15XL daisywheel printer and cut sheet feeder, immaculate – offers. Contact Mr A Savage, London W5. Tel: 081-992 4935

● 1st word Plus MK2, Acorn DTP, Genesis Plus, all – £20 each, Pacmania – £10, Spreadsheet MK5 – £5. Contact Mr G Key, Stockport. Tel: 061-442 5158

● BBC B, 40-track disc drive, high-resolution colour monitor, plinth, joystick, Wordwise +, other Roms, manuals, various programming books and software – £250. Contact R Merricks, Essex. Tel: (0245) 283447

● Watford Electronics four podule backplane for A310 – £10, never been used, Corruption – £12, Overload – £12, also A3000, printer – offers. Contact Mr M Humphreys, Staffordshire. Tel: (0782) 542973

● Wanted: Educational software for BBC for use in children's voluntary work. Contact Mr D Roberts, Baildon. Tel: (0274) 594496

● BBC B Issue 7, excellent condition with 40/80 track disc drive, cassette player plus games and utilities software, 100 Micro User mags from first issue – £150. Contact D McKilligin, Shropshire. Tel: (0952) 588506

● A3000, 1Mb Ram, colour monitor, monitor stand and dust covers, Repton III, and 20 Acorn User discs, in excellent condition and boxed – any reasonable offers will be considered. Contact Mr G Jones, South Wales. Tel: (0685) 723829

● Master 128, opus dual 40/80 track disc drive, Amber monitor, Viewstore Rom, View manuals, reference manuals. Contact Mr N Holden, Middlesex. Tel: (0932) 781637

● A5000 and colour monitor, 2Mb Ram, 40Mb hard disc, 3.5in floppy disc drive and Learning Curve software, as new – £1100 or negotiable. Please contact Mr S Jamieson, Staines. Tel: (0784) 463407

● A3000 user/midi port interface AKA12, as new, unused – £350 ono. Contact Mr J Hoban, Cumbria. Tel: (0228) 401918

● PRM – £140. Wanted: VEC, Taxan 795 or similar monitor. Contact Mr R Payne, South Wimbledon. Tel: 081-544 9904

● Communicate free world-wide using your computer via packet radio. get a novice amateur radio licence. For details please send an SAE to G3ZHI, 52 Hollytree Ave, Maltby, Rotherham, Yorkshire S66 8DY. Tel: (0709) 799911

● Four processor system: Master 512, external switched 6502/4 Mb Arm co-processors, dual DS/80 track disc drives, manuals etc – offers (will split). Contact Mr D Dearlove, Surrey. Tel: (0932) 243064

● Deskjet 500, including PC driver cartridge and paper, hardly used – £250 ono. Contact Mr R Hesketh, Horwood Hall, Keele University, Staffs ST5 5BG.

● Tracker Music and sample – £20, Zelanites – £11. Contact Mr D Thornycroft, Colchester. Tel: (0206) 42896 after 6pm

● Master 128K, Cumana 40/80 track disc drive, Acorn colour monitor, Juki 6100 printer, Wordwise + Rom cartridge, software, games/serious (50 discs). Contact Mr E Wallace, Barnsley. Tel: (0226) 370147

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RICHARD JENKINS

With 46 screen modes on the Arc, finding the one you want can be a headache. Carl Stockton solves the problem with UltiMode

King of the modes

With the arrival of Risc OS 3, the Archimedes now offers 46 screen modes as standard. In addition, there are all those additional modes supplied by companies like Computer Concepts, or designed at home using one of the customiser programs found in any good PD library.

But choice brings its own problems. Wouldn't it be nice if you could select any mode with no more effort than typing its number at the keyboard?

This is where *UltiMode* comes in. Install the application and any mode is instantly accessible, by typing its number on the numeric keypad with SHIFT and ALT held down. So how does it work?

UltiMode, which you will find in the yellow pages, is a relocatable module which works by intercepting all keypresses. If a digit is pressed on the numeric keypad, the state of the SHIFT and ALT keys is checked. If it finds both depressed, *UltiMode* interprets this as a request to change mode. Subsequent keypresses on the keypad are logged until ALT is released, whereon the resulting value sets the mode.

So, to change to Mode 15, hold down SHIFT and ALT, press 1 then 5 on the keypad, and release everything. The whole process is completely transparent, and no other keypresses are affected, so you can use applications as before.

WHY CHANGE MODE?

Many users have a favourite screen mode which they use for all work on the desktop, and you may wonder why you would need to change at all.

There are good reasons for having a range of modes at your disposal. For example, most coloured sprites which originate from a scanner or digitiser (and this will include a lot of the clip-art on the market) are 256-colour images. Displayed in the 16 colours of Mode 12 these can look very strange. To view these pictures realistically you need Mode 15, or, better, 21 or 28 with a multisync or VGA monitor.

There are a number of modes which offer a different aspect ratio, or a larger screen area. Mode 16, for instance, compresses everything on the screen to two-thirds normal width, giving much more space to display text or windows at the expense of readability. Mode 35 uses the screen area usually reserved for the border, giving you more space without any loss of image quality. This unclutters your desktop.

If you use a backdrop such as Acorn's *Pinboard*, sticky icons are less likely to be obscured by windows if you use a larger screen.

There are modes which give you more lines of text on screen: Mode 39 gives you 44 lines as opposed to 32. There is even one mode, 22, which magnifies everything on the screen for the benefit of users with sight defects, or for use in a large classroom.

Using *UltiMode* allows you to try out the effects of any mode quickly and without fuss. If the mode you choose doesn't exist nothing will happen. Bear in mind, though, that many modes are designed for multisync or VGA monitors. If you choose one of these modes when your computer is configured to a standard monitor type, Risc OS will select an equivalent standard mode.

So, dust off your user guide, turn to the section dealing with screen modes and experiment. You'll never have to go through the rigmarole of the Palette menu again.

*INFO

Dave Lawrence and Dave Acton present their monthly mix of programs for all Acorn users

WHAT A DRAG

Programs: Dragging, PatchDrag
Description: Sprite dragging utiltities and additions
Authors: Tim Howard, DL
Machine: 32-bit

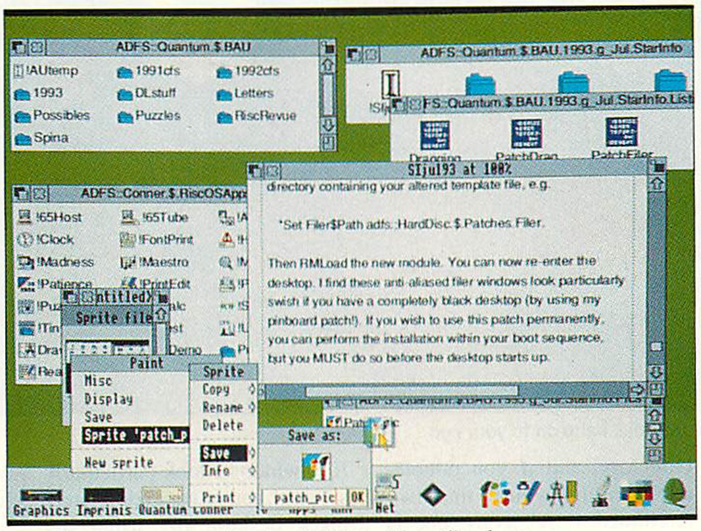
Since our first mention of the sprite dragging capabilities of the Risc OS desktop, we've managed to find out a few more details. Here, Tim Howard shows us how to incorporate sprite dragging into your own applications, and there's a rather neat little OS patch that produces semi-transparent drags. But first, the nitty gritty of the SWIs themselves.

The *DragASprite* module provides two SWI calls: Start initiates a drag and Stop terminates it. Start copies the sprites you give it, so you are free to lose your own copy if you wish. The format of the call is:

```
SWI "DragASprite_Start",
flags,area,sprite,cbox,bbox
```

The exact details can be seen in the box on the page opposite. The corresponding Stop call is only needed to free up the workspace claimed by the Start call, so no parameters need be supplied.

The bounding box (bbox) describes the area of the screen over which the sprite can be dragged. The containing box (cbox) describes a (small) box that contains the sprite. The bottom four bits of R0 tell the SWI where to position the sprite within this box; bit six says whether the bounding area given should prevent this box from escaping or just the pointer; setting bit seven automatically makes a drop shadow for the sprite, by using the sprite's mask.



Dragging transparent sprites in a desktop with outline fonts

Tim obviously has a feel for this call because he sent in the pieces of code needed to incorporate these SWIs into a Wimp save box. Either that, or he had a quick look at the applications in the Risc OS 3 Rom.

Either way, the bits you need are listed in the program *Dragging*. You should first place a call to PROCdrag_init near the start of your code. This reads the SWI numbers for the two calls. If the module is not present (that is, if the program is being run on a Risc OS 2 machine) values of -1 will be returned.

Bit one of CMOS Ram location 28 (this is the bit that dictates whether the Rom applications perform sprite-dragging) is then read; if this is clear the SWI numbers are also set to -1.

The second two pieces of code are not procedures as such. In the routine that calls Wimp_DragBox to start the save box drag, you should make the changes outlined in PROCdrag_start. Note that it checks if the SWI number is valid first, and if it isn't then the standard Wimp_DragBox is called. If not, the appropriate sprite drag is started.

Obviously you should change the 'file_fff' to the name of the filetype you'd like to drag and the q% variables to the name of your wimp parameter block. The call to PROCdrag_stop should be made when a user_drag_box reason code is returned from Wimp_Poll. It is quite likely a call to Wimp_GetPointerInfo will be made, hence the code illustrated in PROCdrag_stop, but this won't necessarily be the case.

An entire example is hard to give, but we promise to include the necessary code in the next desktop application we print in *INFO.

One criticism often levelled against sprite dragging on the desktop is that the sprite itself obscures too much background and sometimes makes it tricky to drop accurately.

A solution is to edit the masks of the filetype sprites so every other pixel is transparent, enabling you to see through the sprite as it is dragged. A certain amount of detail is lost in this process, but the result is quite pleasing. The only problem is that you have to add dithered masks to every sprite you might wish to drag.

Also, the effect appears when the sprites are not being dragged, when they are first displayed in their save boxes. As they are still plotted with their masks, which you've carefully dithered, you get the same bitty appearance – this rather loses its charm on a stationary sprite. Unfortunately, we couldn't just ask the save boxes to plot the sprites without their masks, because some filetypes already have masks. Instead, what we need is a patch to the *DragASprite* module, as provided by the program *PatchDrag*.

To use this program you first need to extract the original module from the Rom. For this you could use the *RMSave* utility from the April 93 issue (the listing for *RMSave* is repeated in the yellow pages this month). The saved module should be called *Drag*. A patched module can be made by simply running *PatchDrag*. This will do the dirty work and save the new module as *NewDrag*, and also insert a copy into the RMA.

Assuming you have configured your machine to use the *DragASprite* module, you

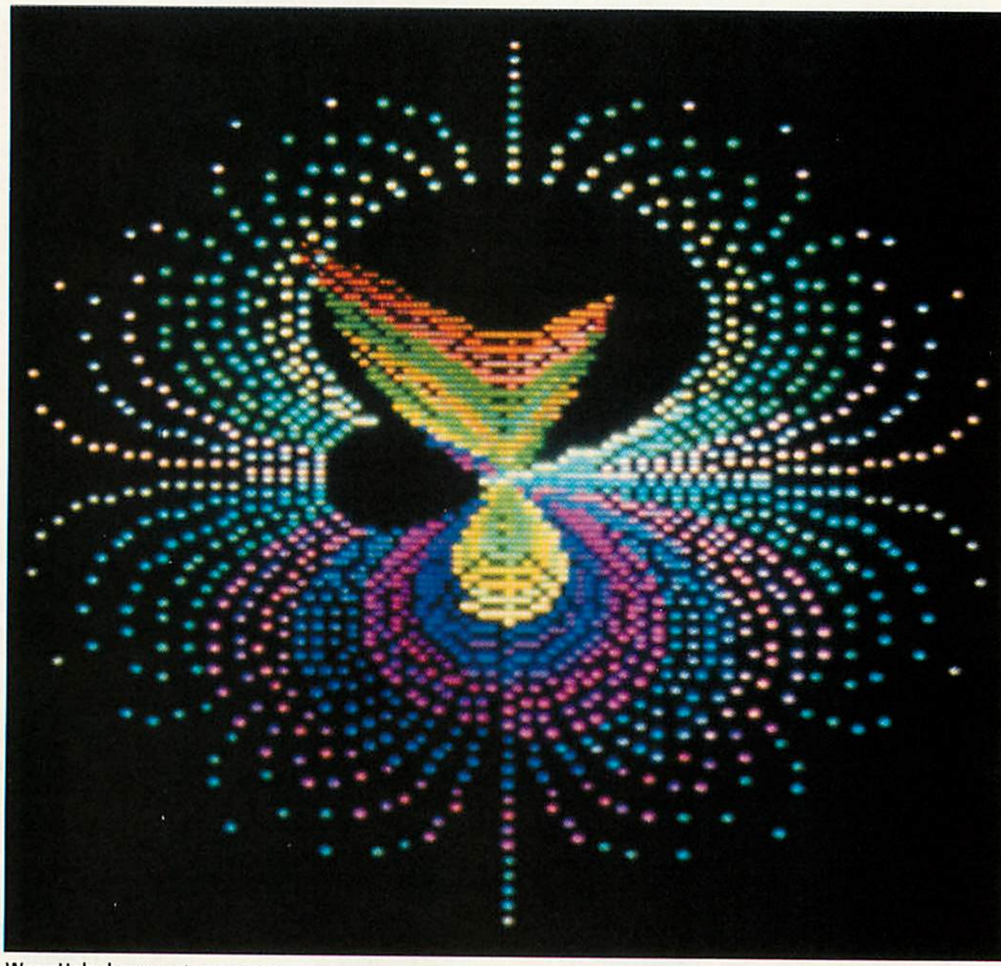
should now have semi-transparent sprite drags. If you want to use this feature permanently, the *NewDrag* module can be loaded by your boot sequence.

The code intercepts the module just after it has created the mask for the sprite it is going to drag. It then reads the size of the sprite and steps through the mask using SpriteOp &2C to set every other pixel to transparent. Control is then returned to the module and continues as normal.

While we're on the subject of prettifying the desktop, here's another little patch for your collection. This one modifies the *Filer* module to give anti-aliased text within directory viewers. You'll need the original filer module, saved as *Filer,* before running *PatchFiler*. This will give you a module called *NewFiler*.

Unfortunately, it is not simply a matter of loading this new module to see the changes. First you must make a copy of the *Filer* directory from the *Resources* branch of the resource filing system. To do this, open $ of Apps and double-click on *Resources*. Scroll through to the Filer directory and drag this somewhere to save.

Now you need to modify the template file within this directory. For this, you'll need a copy of *FormEd*. Double-clicking the template file should reveal a window called



WormHole: hang on to your ego

Directory, and if you double-click on this you'll find two Archimedes 'A' icons: one is used for large icons, the other for small icons and full info. Use the menu and change these icons to use some anti-aliased text; I chose 12 point Homerton Medium.

The small icon should be V centred (so remove the H centre and R justify ticks). It doesn't seem possible to change the anti-aliasing of the text from black to the light grey used by the Filer windows, so the colour of the work area must also be changed to white. If you want, you could also change the title bar to use an outline font. Once you have made these changes, resave the template file. To see the results you must quit the desktop completely and alter the system variable *Filer$Path* to point to the directory containing your altered template file by using a line like:

```
*Set Filer$Path ADFS::HardD
isc.$.Patches.Filer.
```

Then RMLoad the new module. You can now re-enter the desktop. These anti-aliased filer windows look particularly swish if you have a completely black desktop (by using my pinboard patch). If you wish to use this patch permanently, you can perform the installation within your boot sequence by including similar lines to the following at the start of your boot file:

```
Set Filer$Path ADFS::HardDi
sc.$.Patches.Filer.
RMLoad ADFS::HardDisc.!Syst
em.Modules.NewFiler
Desktop
```

TRANSFORMATION

Program: WormHole
Description: Graphic demo
Author: Garry Hill
Machine: 32-bit

This program was originally called *Transform.* It was retitled since it is reminiscent of those scenes in sci-fi movies. You know the type of thing: swirling clouds of matter disappearing into a wormhole that has inconveniently appeared in the time-space continuum.

When run, you are asked if you want manual control (type N to begin with) then you have a choice of a circular or non-circular pattern. The effect is achieved by dragging a whole load of dots through a single point on the screen. In manual mode, click where you want the wormhole to be and press Space to halt the particle. Then, position a new wormhole and repeat.

APRIL FOOL

Program: Real Why? module
Description: Not such an April Fool
Author: Andrew Clover
Machine: 32-bit

Okay. Hands up if you fell for it, both hands up if you typed it in... Patrick Jacolé? An anagram of A Practical Joke. We received a handful of letters concerning our little wheeze; a number of 'you !^*&#@!s'; a few irritated readers and one module that actually does what we claimed ours did.

Andrew Clover – one of the guardians of the DoggySoft PD library – was inspired by our idea and worked out that this seemingly impossible task could be done. Type in and run

DragASprite Start

R1 (area) ->sprite area
- 0 = system sprites
- 1 = wimp pool

R2 (sprite) -> sprite name
R3 (cbox) -> 16-byte block of containing box (x0,y0,x1,y1)
R4 (bbox) -> 16-byte block of bounding box (if bits 4,5 of R0 = %10)
R0 (flags) bits as below:

0-1	posn of sprite in cbox	00 = left, 01 = centre, 10 = right, 11 = undefined
2-3		00 = bottom, 01 = middle 10 = top, 11 = undefined
4-5	bounding box is:	00 = whole screen 01 = this window 10 = (as -> R4)
6		0 = bbox applies to cbox 1 = bbox applies to ptr
7		1 = make a drop shadow
8-31	reserved, must be 0	

Why to assemble a module called *WhyMod*. This intercepts practically every filing system SWI by making use of a new call in Risc OS 3. This call, OS_Args 7 (covered later in this *INFO) displays more helpful prompt boxes when a disc is requested. As a simple test, open a directory viewer for drive 0, remove the disc and then try double-clicking on one of the files in the viewer. The module doesn't actually provide a Why? icon, but you can't have everything.

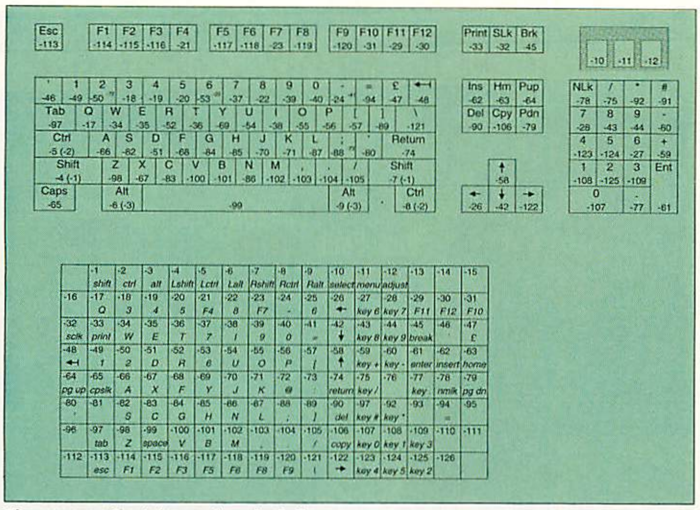
We're now waiting for Andrew to pen a version of *MasonNet* for us and develop the Compact/potato interface.

INKEY KEYS

Feature: Negative Inkey codes
Author: Wally Varley
Machine: 32-bit

Wally is one of the many people irritated by Acorn's decision to stop including a Basic programming manual with new machines. He has, therefore, painstakingly typed in all the negative Inkey values for detecting key presses.

He sent this to us in the form of a large quantity of Data statements and a small program which filled a Mode 27 screen with all the values. We felt this information could be more useful if it was in *Draw* file format – it could then be printed out at a size suitable for your own needs. This we did and the result can be seen on this page; the *Draw* file itself is on the monthly disc.



Those negative Inkey values in full

FOCUS ON FILING

Risc OS 3 offers numerous extensions to the old filing system calls like OS_File and OS_FSControl. Some of these are particularly valuable, saving an immense amount of code. This month's Focus goes over the new calls and you'll find a couple of real-life examples of them elsewhere in this *INFO.

OS_File is used to perform operations on single files, like loading, saving, reading/writing catalogue info and so on. A set of new OS_File calls has been added (20-23) to give the user more useful information about an object: in particular, to spot applications and directories which appear as files (like Dos images). The parameters provided and returned are as follows:

On entry:
 r0 = 20, 21, 22 or 23
 r1 -> object name
 (may include wildcards)
 if r0=21, r4 -> path string
 if r0=22, r4 -> path variable
On exit:
 r0 = object type
 r1 is preserved
 r2 = load address/date stamp
 r3 = exec address/date stamp
 r4 = length
 r5 = attributes
 r6 = filetype (&000-&FFF)
 or special type:
 -1: no file type
 &1000: directory
 &2000: application

As you can see, the input parameters are much the same as for the old OS_File calls. If r0=20, the variable File$Path is used when searching for the specified file. If r0=21, r4 points to a path string which, like File$Path, can contain one or more directories to look in, separated by commas. If r0=22, r4 points to the name of a file path variable which should be treated like File$Path. r0=23 means don't use a path at all.

On exit, an extra type is returned in r6. This may just be the filetype, or can have the special values shown. The utility *FindApps* (see below) uses this call in various places.

One more new OS_File call is provided: 24. This returns the 'natural block size' of a file. When you create or extend a file, disc space can only be allocated in chunks of a minimum size (512 bytes, for example). If your file is just 1 byte long for example, 511 bytes of disc space may have to be wasted after it if the natural block size is 512. The call is used as follows:

On entry:
 r0 = 24
 r1 -> filename
On exit:
 r2 = natural block size, bytes

OS_GBPB standing for 'get bytes, put bytes'. This is called either to read and write several bytes at a time, or to examine directories to find what files and subdirectories lie within.

Since OS_File has been extended to provide additional information about directories and applications, OS_GBPB has also been extended to give this information. The new call 12 behaves like previous calls, taking and returning parameters as follows:

On entry:
 r0 = 12
 r1 -> directory name
 r2 -> buffer
 r3 = number of object names to read into buffer
 r4 = number of first object to read (0 to start with)
 r5 = buffer length
 r6 -> name to match (may include wildcards)
On exit:
 r0-r2 are preserved
 r3 = number of objects read (may be zero)
 r4 = number of next object to read (-1 means finished)
 r5-r6 are preserved

Additionally, the C flag is set on exit if r3 is 0. Assuming at least one object matched the wildcarded name, the buffer is filled with word-aligned records of the following format:

 Offset Contents
 0 = load address/date stamp
 4 = exec address/date stamp
 8 = length
 12 = attributes
 16 = object type (1 = file, 2 = dir and so on)
 20 = object file type (as for OS_File 20-23)
 24 = object name, null terminated

FindApps uses this call in order to find all the applications on your disc as quickly and simply as possible.

OS_Args is an odd little call providing invaluable functions for handling files opened with OS_Find (referred to by handle rather than by name). Two new reason codes are supported. OS_Args 8 is used by image filing systems (like *DosFS*) to inform *Filecore* that an image file's unique ID has been changed, to avoid 'disc changed' type errors. OS_Args 7 is much more useful to the average user, taking a file handle and returning the name.

In most programs you will have opened your own files and will not need this call to remind you of which handle applies to which file. Certain applications that intercept OS_Find and the like will find this call very useful, though. For a genuine example have a look at the real *Why?* module by Andrew Clover in this *INFO. For the record, parameters are:

On entry:
 r0 = reason code
 r1 = file handle
 r2 -> buffer to hold name
 r5 = size of buffer
On exit:
 r5 = number of spare bytes in buffer

Call twice, like OS_FSControl 37 to find what size buffer is needed.

OS_FSControl is the 'misc' call of the filing system world and has been enhanced more than any other FS call in Risc OS 3. Reason codes 35 to 54 are new. Many of these are of little use to most people. Here is a list of the new calls with details when useful:

35, 36: add/remove an image filing system (like *DosFS*). These calls are only useful if you're writing an image filing system, in which case you've probably got a set of *Programmer's Reference Manuals* to refer to.

37: an invaluable call which takes a filename (which may contains wildcards) and converts into a complete path-

name, including disc and directory name when not provided. Thus, if you give it *fred* it may return *adfs::HardDisc.$.temp.Fred.* *FindApps* uses this call which takes the following parameters:

On entry:
r0 = 37
r1 -> pathname to convert
r2 -> buffer
r5 = size of buffer (note: r5 and not r3)

On exit:
r5 = number of spare bytes in buffer (including terminator)

If you call once with r2 and r5 set to zero, r5 will return minus the number of bytes needed. Now you can call again having claimed -r5 bytes from somewhere.

38: convert file information to a more useful object type:

On entry:
r0 = 38
r1 -> name
r2 = load address
r3 = exec address
r4 = length
r5 = attributes
r6 = object type (1 = file, 2 = directory, 3 = image file)

On exit:
r2 = object filetype (as for OS_File 20-23)

39: set the URD to the string pointed to by r1

40: perform the equivalent of *Back

41: return the defect list for an image

42: map out a defect from an image

43, 44 and 45 unset the current directory, URD and library respectively.

46: return the used space map of an image file (Dos and so forth)

47 and 48 read/write the boot option of a disc or image file holding a named object. This is equivalent to *Opt 4,x. Parameters are:

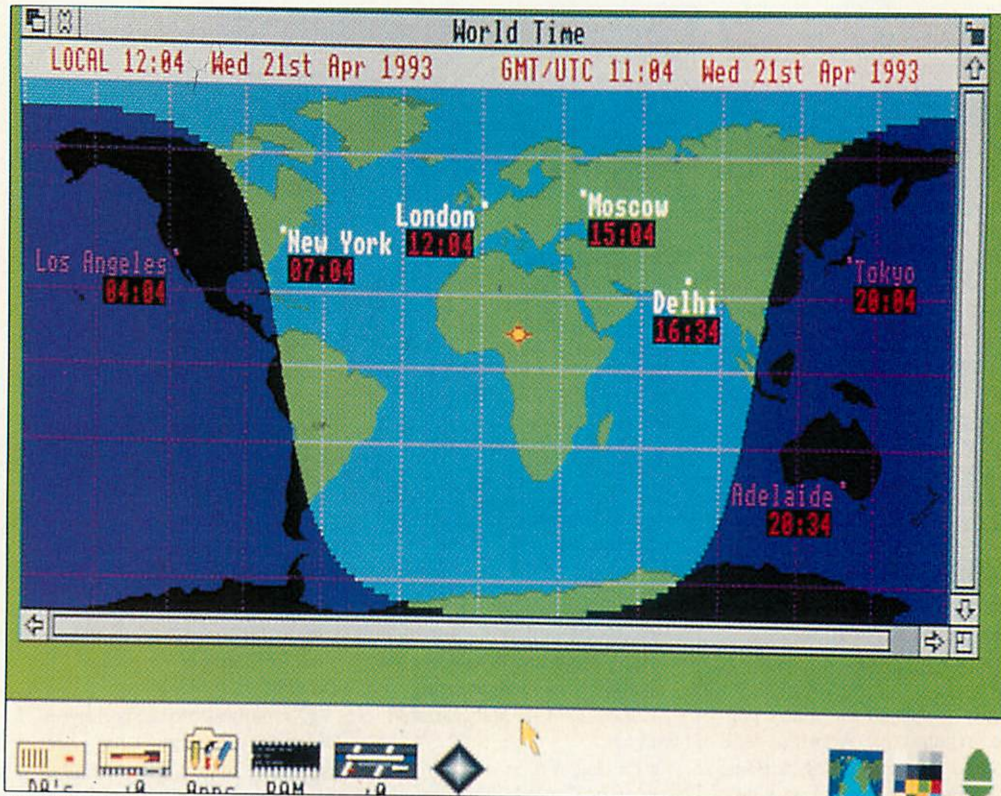
On entry:
r0 = 47 (read) or 48 (write)
r1 -> name of object
r2 = new boot option r0 = 48

On exit:
r0 - r1 preserved
r2 = boot option (r0 = 47) or preserved (r0 = 48)

49: reads the free space on a disc or image containing a named object:

On entry:
r0 = 49
r1 -> name of object

On exit:



WorldTime tells you international times and the position of the sun, all in one fell swoop

r0 = free space
r1 = size of largest object that can be created
r2 = size of disc

50: renames a disc or image file containing a given object:

On entry:
r0 = 50
r1 -> name of object
r2 -> new disc name

On exit:
r0-r2 preserved

51 is used by *FileCore* to request an image file's unique ID is updated. See OS_Args above.

52: scans a disc or image to find which object occupies a particular disc address. This is useful in trying to recover files, map out a defect.

On entry:
r0 = 52
r1 -> name of image file o disc
r2 = offset info image file/disc
r3 -> buffer to receive object name
r4 = buffer length

On exit:
buffer contains object name (if found) and r2 contains kind of object:
0 = no object found (outside disc/not used/defect)
1 = no object found (offset used for free space map or other non-file use)
2 = object found (cannot share offset with other objects)
3 = object found (can share offset with other objects)

53: sets a directory to a given path without checking the path is okay.

On entry:
r0 = 53
r1 -> new path
r2 = directory to set (0 = CSD, 1 = previously selected directory, 2 = URD, 3 = library)
r3 -> name of FS (for example, *ADFS*)
r6 -> special field (or 0 if none)

On exit:
all registers preserved

The special field is used on networks/archives and so on: anywhere where a # appears in a pathname. The text following # should be pointed to by r6.

54 is the reverse of 53 and reads the path of a specified directory:

On entry:
r0 = 54
r1 -> buffer to hold pathname
r2 = directory to read (as for OS_FSControl 53)
r3 -> name of FS
r5 = size of buffer (or 0 to read required size)

On exit:
buffer is filled with pathname
r1 -> rest of path, or 0 if directory is not set
r5 has length of string (with terminator) subtracted
r6 -> special field, terminated with null or '.' (or 0 if none)

Like previous calls, use this twice: after the first call (with r5 = 0), and on exit r5 =-(bytes needed).

WHAT'S THE TIME?

Program: WorldTime
Description: Graphical world clock
Author: PE Marshall
Machine: 32-bit

We've had a collection of submissions from PE Marshall, who lives in Antigua (imagine, tapping away in a hammock in the cool tropical breeze, trying not to spill Lilt over your keyboard). Since all Mr Marshall's submissions have a similar time/calculator theme, we decided to carry them all in one go.

The finest offering is a little too long to publish so we've included it as a bonus on the subscriber's disc. It provides a map of the world in a window, showing (as required) which

part of the world is in light/darkness, where the sun is, the positions of major cities and what time it is there. Options for local time (US Daylight Saving Time or European Summer Time) are provided, and you can show the picture for any day or time you like, or simply watch the sun rising and setting across the world as it happens.

BOOTMAKER

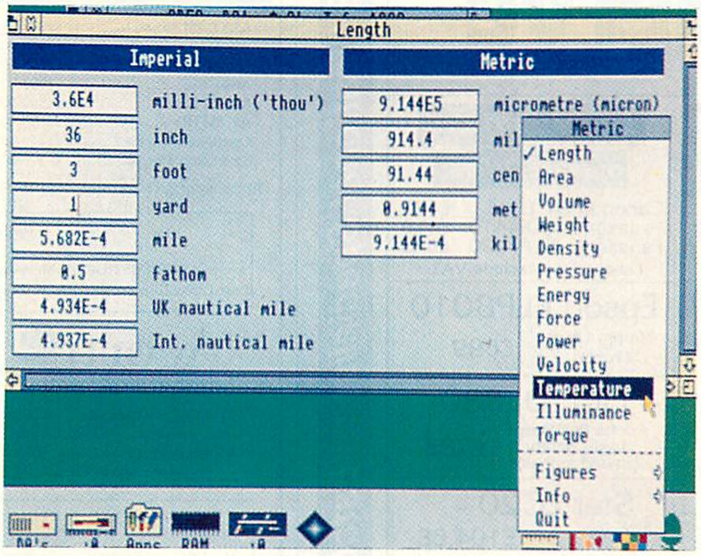
Program: FindApps
Description: Desktop utility
Author: DCA
Machine: 32-bit

This short program is a Risc OS 3 variant on an old theme. As you will know, unless an application such as *Pipedream* has been seen by the filer, clicking on a file relevant to that application will have no effect, other than to give an error. *FindApps* looks through your hard disc to find all the applications in there.

It builds an Obey file as it goes which, when run, executes the *!Boot* files in any applications it comes across. These generally declare filetypes and set up system variables to install applications when files are double-clicked. After you switch your machine on, type *Desktop -file boot_list to go into the desktop. When the disc has stopped whirring, all filetypes will be known. You can double-click on anything and whatever application is required will be loaded automatically.

The program asks for various things: the directory to scan (*adfs::4.$* by default); the output file (*%.boot_list* by default); and whether or not *Impression* documents should be ignored. Since these appear as applications, the program would otherwise load their sprite files into the Wimp sprite pool and you would end up with a large number of identical sprites. Not much use to anyone.

If you answer 'N' the program looks at the *!Run* file of each application found. If the command RunImpression is discovered it is assumed the application is an *Impression* document. You are also asked for the 'preferred sprite file' name. Risc OS 3 allows high-resolution sprite files to be



Metric brings you up to date with all those modern units like inches and feet

included (as *!Sprites22*). These will be loaded if you have a multisync monitor. Whatever name you give will be checked for first; if no file of that name is found within an application, plain old *!Sprites* will be looked for instead. If a sprite file of some description is spotted, the appropriate *IconSprites command is added to the startup file.

When finished, the file is ready to be used with the *Desktop command, as stated above. If you already have a startup file then you might like to add a line `*Obey %.boot_list` or whatever.

The new filing system calls made the writing of *FindApps* quite simple. It is recursive, as you would expect with PROCscan doing the work. This scans a directory using OS_GBPB. Any subdirectories found are processed recursively by called PROCscan. Applications are examined and the startup file added if needed. Other files are simply ignored.

As well as a directory name, PROCscan takes the start and end addresses of a buffer as parameters. This is initially big (64K) to allow all objects in a subdirectory to be read in at one go. The start address is moved past the data read in before PROCscan calls itself to examine subdirectories.

OS_GBPB 12 is used to do the scanning and the special objects 'directory' and 'application' are noted. OS_FSControl 37 is used to convert the name of a directory into the fullest possible form (disc name and all). This is important to avoid ambiguity and allow you to create different startup files for different discs and filing systems (ADFS, SCSI, Net).

Note how the unused pointer returned by OS_FSControl 37 is employed to swap the null terminator for a &0D so the string can be read in Basic. OS_File 20 is also used a lot in *FindApps* as a convenient way of checking filetypes.

MARSHALL ARTS

Program: Sunrise
Description: Calculates time of sunrise/sunset
Author: PE Marshall
Machine: All

This cunningly-short offering tells you when the sun rises and sets in London and Antigua. You can add new places by specifying longitude and latitude. If you have a 32-bit machine press Return twice for 'today', otherwise enter the date. If you live in the Arctic you may be told (corrrectly) that the sun won't rise or set at all. The program revolves around fiendish formulae which we can only admire and not hope to explain.

WORK IT OUT

Programs: MetricDat, !RunImage, Metric8
Description: Metric converter
Author: PE Marshall
Machine: Eight-bit and 32-bit

This provides a useful desktop calculator/converter. 32-bit users will need to create a directory *!Metric* and save in it the program *!RunImage*. Then, inside the directory, run *MetricDat* to create the other files needed. Eight-bit users need only run *Metric8*.

32-bit users should double-click on *!Metric* to install. Then click on the icon to bring up the conversion window. Enter any value you like in the box of your choice and press Return: the value will be converted into all the units shown. Use the menu to select the category you require (length, volume, temperature) and also to set the number of significant figures. You can enter expressions in a box if you like (they are simply evaluated using Basic's Eval command).

Eight-bit users should first select the category required by entering the appropriate number. Then use the up/down cursor keys to select the desired unit and enter a value or expression. Press Escape to return to the main menu or Shift-Escape to quit. The left/right cursor keys alter the significant figures.

HINTS AND TIPS

Christopher Swales has found if you set the top bit of CMOS Ram location 24 (*FX 162,24,128 will do the trick) then reset, you get a picture of a disc instead of the normal startup sequence. Clicking Menu or Adjust returns you to the OS as normal, while Select tries to boot off the floppy drive. *FX 162,24,0 will set your machine back to normal.

*DISC

There are a number of disc-only pieces this month. So eight-bit users do not feel left out, we have an adventure for you from JA McHugh. This is not on the yellow pages as it is too long; typing in the data would give the game away.

*QUIT

Listings, applications, hints, tips, requests are always welcome. All but the shortest listings should be on disc with a description. Please write your name and address on all discs. A stamped, self-addressed envelope will ensure return of your discs.

Send your submissions to this address: *INFO, *BBC Acorn User*, Redwood Publishing, 101 Bayham Street, London NW1 0AG.

YELLOW PAGES

Free programs for you to type in and use

HOW TO ENTER THE PROGRAMS

This section describes how to enter and use the more complicated programs in the yellow pages. A lot of the explanations mention the Currently Selected Directory (CSD): for more details on the CSD, see the box below.

***INFO (page 111)**

Info2 - Info3, Info11

Both these programs take modules and produce patched versions of them. The modules must be saved onto disc, using the *RMSave* utility from April 1993 (which is repeated here as Info11). The two modules should be saved as *DragASprit* and *Filer*.

Type in *RMSaveS* and save it. Double-click on the program to save a utility called *RMSave* in the CSD. To save a module to disc, press F12 and type, for example:

```
RMSave Filer
```

This example will save the *Filer* module to disc as *Filer*. To save the *DragSAprite* module, type:

```
RSave DragASprite
```

Info6

When you run *FindApps*, the default save path for the Obey file is *%.boot_list*. The percentage means your library directory, but if you do not have a library directory set up, the file will be saved in the root directory of the current disc.

Info8 - Info9

To create the Metric application, do the following:

- Create a directory called *!Metric*.
- Double-click on this directory while holding down SHIFT.
- Type in the two programs *MetricDat* and *!RunImage* and save them inside *!Metric*.
- Set the CSD to *!Metric*.
- Double-click on *MetricDat* in order to create the *!Run* and *!Sprites* files.

3D GRAPHICS (page 98)

3DGraphics2 - 3DGraphics4

These three programs form the source code for the *BAU3D* module. To create the module, do the following:

- Type in the program *BAU3DSrce* and save it.
- Create a directory called *Source* in the same directory as you saved *BAU3DSrce*.
- Type in the two programs *SWI00* and *Version* and save them inside *Source*.
- Set the CSD to the directory containing *BAU3DSrce*.
- Double-click on *BAU3DSrce* and the *BAU3D* module will be saved in the CSD.

3DGraphic6

This program contains a new version of the procedure *PROCplay_back*. The new procedure should replace *PROCplay_back* in the *3Dprocs* program from last month.

ULTIMODE (page 109)

The *UltiMode* program assembles a module called *UltiRM*, and saves it in the CSD. Double-click on *UltiRM* to load the module; when it is loaded you can change mode by holding down SHIFT and ALT and typing the mode number on the numeric keypad.

Setting the Currently Selected Directory (CSD)

Some of the explanations above require the CSD to be set to a certain directory in order for them to work. To do this, you must first create an Obey file (using *Edit*) containing just the following line:

```
Dir <Obey$Dir>
```

Next save it under the name *ThisDir* in the directory you wish to set as the CSD. Finally, double-click on *ThisDir* to set the CSD to that directory.

COMPATIBILITY CHART

Use this chart to check if a program will work on your machine. There are two columns: one for eight-bit machines like the Model B and Master 128, and one for 32-bit machines, like the A3000, A400 or A3010. If there is a star for the program in the column then it will work on your machine. Special exceptions and hardware requirements are listed as footnotes at the end of the table.

Article	Program Name	8-bit	32-bit
***INFO (page 111)**			
Info1	*Dragging*		*
Info2	*PatchDrag*		*
Info3	*PatchFiler*		*
Info4	*Wormhole*		*
Info5	*Why?*		*
Info6	*FindApps*		*
Info7	Sunrise		*
Info8	*MetricDat*		*
Info9	*!RunImage*		*
Info10	*Metric8*	*	
Info11	*RMSaveS*		*
3D GRAPHICS (page 98)			
3DGraphics1	Bres		*
3DGraphics2	BAU3DSrce		*
3DGraphics3	SWI100		*
3DGraphics4	Version		*
3DGraphics5	PolyDemo		*
3DGraphics6	PlayBack		*
3DGraphics7	Gouraud		*
3DGraphics8	Vase		*
ULTIMODE (page 109)			
UltiMode1	*UltiMode*		*

*INFO (page 111)

Listing Info1

```
  10 REM     >Dragging (Info1)
  20 REM By  Tim Howard
  30 REM For Risc OS 3
  40 REM (c) BAU July 1993
  50 :
  60 PRINT "Sorry, you can't run this p
rogram!"
  70 END
  80 :
  90 DEF PROCdrag_init
 100 drag_start%=FNswi("DragASprite_Sta
rt")
 110 drag_stop%=FNswi("DragASprite_Stop
")
 120 SYS "OS_Byte",161,28 TO ,,cmos
 130 IF (cmos AND 2)=0 drag_start%=-1:d
rag_stop%=-1
 140 ENDPROC
 150 :
 160 DEF FNswi(swi$)
 170 SYS "XOS_SWINumberFromString",,swi
$ TO swi;flag
 180 IF (flag AND 1) swi=-1
 190 =swi
 200 :
 210 DEF PROCdrag_start
 220 ...
 230 ...
 240 IF drag_start%=-1 THEN
 250  SYS "Wimp_DragBox",,q%
 260 ELSE
 270  SYS drag_start%,%11000101,1,"file
_fff",q%+8,q%+24
 280 ENDIF
 290 ENDPROC
 300 :
 310 DEF PROCdrag_stop
 320 IF drag_stop%<>-1 SYS drag_stop%
 330 SYS "Wimp_GetPointerInfo",,q%
 340 ...
 350 ...
 360 ENDPROC
```

Listing Info2

```
  10 REM     >PatchDrag (Info2)
  20 REM By  Dave Lawrence
  30 REM For Risc OS 3.1
  40 REM (c) BAU July 1993
  50 :
  60 DIM block 20000
  70 SYS "OS_File",&FF,"DragASprit",blo
ck TO ,,,,len
  80 :
  90 sp=13:link=14:pc=15
 100 FOR pass=0 TO 2 STEP 2
 110 P%=block+len
 120 [OPT pass
 130 .hatch
 140          LDMIA   (sp)!,{r0-r3 }
 150          SWI     "XOS_SpriteOp"
 160          BVS     back
 170
 180          STMFD   (sp)!,{r0-r7 }
 190
 200          MOV     R0,#&228
 210          SWI     "XOS_SpriteOp"
 220          MOV     R6,R3
 230          MOV     R7,R4
 240
 250          MOV     R5,#0
 260          MOV     R4,#0
 270 .yloop
 280          AND     R3,R4,#1
 290 .xloop
 300          MOV     R0,#&22C
 310          SWI     "XOS_SpriteOp"
 320          ADD     R3,R3,#2
 330          CMP     R3,R6
 340          BLE     xloop
 350
 360          ADD     R4,R4,#1
 370          CMP     R4,R7
 380          BLT     yloop
 390
 400          LDMIA   (sp)!,{r0-r7 }
 410          CMP     PC,#0
 420          B       back
 430
 440 .fg      EQUS    "fg"
 450          EQUB    0
 460          ALIGN
 470 ]
 480 end=P%
 490 P%=block+&2A8
 500 [OPT pass
 510          B       hatch
 520          MOV     R0,R0
 530 .back
 540 ]
 550 NEXT
 560 :
 570 SYS "OS_File",10,"NewDrag",&FFA,,b
lock,end
 580 SYS "OS_Module",11,block,end-block
```

Listing Info3

```
  10 REM     >PatchFiler (Info3)
  20 REM By  Dave Lawrence
  30 REM For Risc OS 3.1
  40 REM (c) BAU July 1993
  50 :
  60 DIM block 30000
  70 SYS "OS_File",&FF,"Filer",block TO
 ,,,,len
  80 :
  90 sp=13:link=14:pc=15
 100 FOR pass=0 TO 2 STEP 2
 110 P%=block+len
 120 [OPT pass
 130 .patch
 140          ADR     R4,array
 150          MOV     pc,link
 160 .array
 170          EQUS    STRING$(128,CHR$0)
 180          EQUS    STRING$(128,CHR$0)
 190 ]
 200 end=P%
 210 P%=block+&5060
 220 [OPT pass
 230          BL      patch
 240 ]
 250 NEXT
 260 :
 270 SYS "OS_File",10,"NewFiler",&FFA,,
block,end
```

Listing Info4

```
  10 REM     >WormHole (Info4)
  20 REM By  Garry Hill
  30 REM For 32-bit machines
  40 REM (c) BAU July 1993
  50 :
  60 ON ERROR PROCerror:END
  70 n%=2500
  80 width%=100
  90 height%=100
 100 acc%=14:REM must be <20 and >10, 1
4 is best.
 110 manual%=FNyes("Manual")
 120 RiscOs3%=TRUE
 130 n%=(n% DIV 4)*4
 140 MODE 0
 150 sft%=2^acc%
 160 DIM code% 2048+n%*20+sft%
 170 PROCassem
 180 ox%=160-(width% DIV 2)
 190 oy%=128-(height% DIV 2)
 200 PROCinit
 210 IF manual% PROCtrans_manual ELSE P
ROCtrans_auto
 220 END
 230 :
 240 DEF PROCinit
 250 *pointer
 260 MOUSE OFF
 270 IF FNyes("Circular") THEN
 280 SYS "Hourglass_On"
 290 da=(2*PI)/n%
 300 ang=0
 310 ox%=ox%+width%/2
 320 oy%=oy%+width%/2
 330 FOR c%=0 TO (n%-1)*20 STEP 20
 340  data_table!(c%)=(ox%+width%*.5*CO
S(ang)*FNfou(.01,14))*sft%
 350  data_table!(c%+4)=(oy%+width%*.5*
SIN(ang)+FNfou(.01,7))*sft%
 360  data_table!(c%+16)=(c%/(n%*20))*2
03+48
 370  ang+=da
 380  SYS "Hourglass_Percentage",((c%/2
0)/n%)*100
 390 NEXT
 400 ELSE
 410 xstep=width%/SQR(n%)
 420 ystep=height%/SQR(n%)
 430 x=0:y=0
 440 SYS "Hourglass_On"
 450 FOR c%=0 TO (n%-1)*20 STEP 20
 460 data_table!(c%)=(ox%+x)*sft%
 470 data_table!(c%+4)=(oy%+y)*sft%
 480 data_table!(c%+16)=(c%/(n%*20))*20
3+48
 490 x+=xstep
 500 IF x>=width% x=0:y+=ystep
 510 SYS "Hourglass_Percentage",((c%/20
)/n%)*100
 520 NEXT
 530 ENDIF
 540 SYS "Hourglass_Smash"
 550 MODE 15:MODE 13:OFF
 560 SYS "OS_Byte",112,2
 570 SYS "OS_Byte",113,1
 580 CALL getscreen
 590 ENDPROC
 600 :
 610 DEF PROCtrans_auto
 620 REPEAT
 630  PROCconvergence_auto
 640  CALL components
 650  !repeats=RND(130)+50
 660  IF RiscOs3% MOUSE TO tx%,ty%
 670  CALL transform_auto
 680 UNTIL FALSE
 690 ENDPROC
 700 :
 710 DEF PROCtrans_manual
 720 REPEAT
 730  PROCconvergence_man
 740  CALL components
 750  CALL transform_man
 760 UNTIL FALSE
 770 ENDPROC
 780 :
 790 DEF FNfou(amp,f%)
 800 =amp*width%*COS(ang*f%)
 810 :
 820 DEF PROCconvergence_auto
 830 CALL mean
 840 tx%=(!mx)/n%+SGN(FNrndpoint)*(FNrn
dpoint)^2
 850 ty%=(!my)/n%+SGN(FNrndpoint)*(FNrn
dpoint)^2
 860 IF tx%>320 tx%-=RND(200)
 870 IF tx%<0 tx%+=RND(200)
 880 IF ty%<0 ty%+=RND(200)
 890 IF ty%>256 ty%-=RND(200)
 900 !focusx=tx%*sft%
 910 !focusy=ty%*sft%
 920 ENDPROC
 930 :
 940 DEF PROCconvergence_man
 950 MOUSE ON
 960 REPEAT
 970  MOUSE mx%,my%,mb%
 980 UNTIL mb%<>0
 990 MOUSE OFF
1000 !focusx=(mx% DIV 4)*sft%
1010 !focusy=(256-(my%DIV 4))*sft%
1020 ENDPROC
1030 :
1040 DEF FNrndpoint
1050 =RND(1600)/100-8
1060 :
1070 DEF FNyes(prompt$)
1080 *fx 15
1090 PRINT prompt$+"?  (Y/N)"
1100 q$=GET$
1110 =(q$="y") OR (q$="Y")
1120 :
1130 DEF PROCassem
1140 data=10:scr=11:c=9:x=2:y=3:xv=4:yv
=5:col=6:rep=7
1150 ex=5:ey=6:dx=7:dy=8:tab=12:ra=11
1160 sp=13:link=14:pc=15
1170 PRINT "Compiling..."
1180 FOR pass%=0 TO 2 STEP 2
1190 P%=code%
1200 [OPT pass%
1210 .components
1220          STMFD   (sp)!,{link }
1230          BL      datapoint
1240          LDR     ex,focusx
1250          LDR     ey,focusy
1260 .velocitiesloop
1270          LDR     r0,[data]
1280          LDR     r1,[data,#4]
1290          SUB     dx,ex,r0
1300          SUB     dy,ey,r1
1310          BL      sqr
1320          MOV     r0,dx,ASL #(20-acc
%)     \ small increase in accuracy(?)
1330          MOV     r1,ra,ASR #(acc%-(
20-acc%))
1340          CMP     r1,#0
1350          BEQ     zero
1360          FNdiv
1370          FNlessthanone
1380          STR     r0,[data,#8]
1390          MOV     r0,dy,ASL #(20-acc
%)
1400          MOV     r1,ra,ASR #(acc%-(
20-acc%))
1410          FNdiv
1420          FNlessthanone
1430          STR     r0,[data,#12]
1440          B       nextone
1450 .zero
1460          MOV     r0,#0
1470          STR     r0,[data,#8]
1480          STR     r0,[data,#12]
1490 .nextone
1500          ADD     data,data,#20
1510          SUBS    c,c,#1
1520          BNE     velocitiesloop
1530          LDMFD   (sp)!,{pc }
1540
1550 .sqr     STMFD   (sp)!,{dx ,dy,link}
1560          ADR     tab,sqr_tab
1570          CMP     dx,#0
1580          RSBLT   dx,dx,#0
1590          CMP     dy,#0
1600          RSBLT   dy,dy,#0
1610          MOV     r0,dx,ASR #20-acc%
+2
1620          MOV     r1,dy,ASR #20-acc%
+2
1630          CMP     r0,r1
1640          BGT     acute
1650          BLT     obtuse
1660          LDR     r1,fortyfive
1670          MOV     r0,dx,ASR #acc%-(2
0-acc%)
1680          MUL     r0,r1,r0
1690          MOV     ra,r0,ASR #20-acc%
1700          B       end
1710 .obtuse
1720          MOV     dy,dy,ASR #acc%-(2
0-acc%)
1730          CMP     dy,#0
1740          MOVEQ   r0,dx
1750          BEQ     end
1760          MOV     r0,dx,ASL #20-acc%
1770          MOV     r1,dy
1780          FNdiv
1790          MOV     r0,r0,ASR #2
1800          LDR     r1,[tab,r0,ASL #2]
1810          MUL     r0,r1,dy
1820          MOV     ra,r0,ASR #20-acc%
1830          B       end
1840 .acute   MOV     dx,dx,ASR #acc%-(2
0-acc%)
1850          CMP     dx,#0
1860          MOVEQ   r0,dy
1870          BEQ     end
1880          MOV     r0,dy,ASL #20-acc%
1890          MOV     r1,dx
1900          FNdiv
1910          MOV     r0,r0,ASR #2
1920          LDR     r1,[tab,r0,ASL #2]
1930          MUL     r0,r1,dx
1940          MOV     ra,r0,ASR #20-acc%
1950 .end     LDMFD   (sp)!,{dx ,dy,pc}^
1960
1970 .divbyzero
1980          EQUD    18
1990          EQUS    "Division by zero
in code"
2000          EQUB    0
2010          ALIGN
2020
2030 .fortyfive EQUD SQR(2)*sft%
2040 .focusx    EQUD 0
2050 .focusy    EQUD 0
2060 .sqr_tab
2070 ]
2080 P%+=sft%+4
2090 [OPT pass%
2100 .getscreen
2110          ADR     r0,vdu
2120          ADR     r1,writescreen
2130          ADR     r2,readscreen
2140          SWI     "OS_ReadVduVariabl
es"
2150          MOV     pc,link
2160 ]
2170 IF manual% THEN
2180 [OPT pass%
2190 .transform_man
2200          STMFD   (sp)!,{link }
2210 .mainloop
2220          BL      cls
2230          LDR     scr,writescreen
2240          ADR     data,data_table
2250          LDR     c,total
2260 .explodeloop
2270          FNmovepoint
2280          FNmovepoint
2290          FNmovepoint
2300          FNmovepoint
2310          SUBS    c,c,#4
2320          BNE     explodeloop
2330          BL      swap
2340          MOV     r0,#19
2350          SWI     "OS_Byte"
2360          MOV     r0,#&81
2370          MOV     r1,#256-99
2380          MOV     r2,#255
2390          SWI     "OS_Byte"
2400          CMP     r1,#255
2410          BNE     mainloop
2420          LDMFD   (sp)!,{pc }
2430 ]
2440 ELSE
2450 [OPT pass%
2460 .transform_auto
2470          STMFD   (sp)!,{link }
2480          LDR     rep,repeats
2490 .mainloop
2500          BL      cls
2510          LDR     scr,writescreen
2520          ADR     data,data_table
2530          LDR     c,total
2540 .explodeloop
2550          FNmovepoint
2560          FNmovepoint
2570          FNmovepoint
2580          FNmovepoint
2590          SUBS    c,c,#4
2600          BNE     explodeloop
2610          BL      swap
2620          MOV     r0,#19
2630          SWI     "OS_Byte"
2640          SUBS    rep,rep,#1
2650          BNE     mainloop
2660          LDMFD   (sp)!,{pc }
2670
2680 .repeats EQUD 0
2690 ]
2700 ENDIF
2710 [OPT pass%
2720 .swap    STMFD   (sp)!,{link }
2730          LDR     r0,writescreen
2740          LDR     r1,readscreen
2750          STR     r1,writescreen
2760          STR     r0,readscreen
2770          LDR     r0,write
2780          LDR     r1,read
2790          STR     r1,write
2800          STR     r0,read
2810          MOV     r0,#112
2820          SWI     "OS_Byte"
2830          MOV     r0,#113
2840          LDR     r1,read
2850          SWI     "OS_Byte"
2860          LDMFD   (sp)!,{pc }
2870
2880 .cls
2890          STMFD   (sp)!,{rep ,link}
2900          ADR     r12,blank
2910          LDMFD   r12,{r0-r9 }
2920          MOV     r11,#&14000
2930          LDR     r12,writescreen
2940 .clsloop
2950 ]
2960 FOR i%=1 TO 8
2970 [OPT  pass%
2980          STMIA   r12!,{r0-r9 }:]
2990 NEXT  i%
3000 [OPT  pass%
3010          SUBS    r11,r11,#320
3020          BNE     clsloop
3030          LDMFD   (sp)!,{rep ,pc}
3040
3050 .mean    STMFD   (sp)!,{link }
```

```
3060         ADR     data,data_table
3070         LDR     c,total
3080         MOV     r0,#0
3090         MOV     r1,#0
3100 .sum    LDR     y,[data,#4]
3110         LDR     x,[data],#20
3120         ADD     r0,r0,x,ASR #acc%
3130         ADD     r1,r1,y,ASR #acc%
3140         SUBS    c,c,#1
3150         BNE     sum
3160         STR     r0,mx
3170         STR     r1,my
3180         LDMFD   (sp)!,{pc }
3190
3200 .datapoint
3210         STMFD   (sp)!,{link }
3220         ADR     data,data_table
3230         LDR     c,total
3240         LDMFD   (sp)!,{pc }
3250
3260 .vdu         EQUD 148
3270              EQUD 149
3280              EQUD -1
3290 .writescreen EQUD 0
3300 .readscreen  EQUD 0
3310 .total       EQUD n%
3320 .write       EQUD 2
3330 .read        EQUD 1
3340 .mx          EQUD 0
3350 .my          EQUD 0
3360
3370 .blank       EQUS STRING$(40,CHR$0
)
3380
3390 .data_table
3400 ]
3410 NEXT
3420 FOR off%=0 TO sft% STEP 4
3430  y=off%/sft%
3440  sqr_tab!(off%)=SQR(y^2+1)*sft%
3450 NEXT
3460 CLS
3470 ENDPROC
3480 :
3490 DEF FNplot(x,y,col)
3500 [OPT pass%
3510         CMP     x,#320*sft%
3520         BCS     P%+28
3530         CMP     y,#256*sft%
3540         BCS     P%+20
3550         MOV     y,y,ASR #acc%
3560         ADD     r0,scr,y,ASL#6
3570         ADD     r0,r0,y,ASL#8
3580         STRB    col,[r0,x,ASR #acc
%]
3590 ]
3600 =0
3610 :
3620 REM Thanks to Dabs Press for the f
ollowing division routine.
3630 :
3640 DEF FNdiv
3650 [OPT pass%
3660         MOV     r4,#0
3670         CMP     r0,#0
3680         RSBLT   r0,r0,#0
3690         MOVLT   r4,r0
3700         BEQ     P%+116
3710         CMP     r1,#0
3720         BEQ     P%+100
3730         CMP     r0,r1
3740         MOVMI   r0,#0
3750         BMI     P%+96
3760         MOV     r3,#0
3770         MOV     r2,#1
3780         CMP     r1,#0
3790         BMI     P%+32
3800         CMP     r1,r0
3810         BHI     P%+16
3820         MOVS    r1,r1,LSL#1
3830         MOV     r2,r2,LSL#1
3840         B       P%-20
3850         MOV     r1,r1,LSR#1
3860         MOV     r2,r2,LSR#1
3870         CMP     r0,r1
3880         SUBCS   r0,r0,r1
3890         ADDCS   r3,r3,r2
3900         MOV     r1,r1,LSR#1
3910         MOVS    r2,r2,LSR#1
3920         BCC     P%-20
3930         MOV     r0,r3
3940         CMP     r4,#0
3950         RSBNE   r0,r0,#0
3960         B       P%+12
3970         ADR     r0,divbyzero
3980         SWI     "OS_GenerateError"
3990 ]
4000 =0
4010 :
4020 DEF FNmovepoint
4030 [OPT pass%
4040         LDMFD   data,{x ,y,xv,yv,co
l}
4050         ADD     x,x,xv
4060         ADD     y,y,yv
4070         STR     y,[data,#4]
4080         STR     x,[data],#20
4090         FNplot(x,y,col)
4100 ]
4110 =0
4120 :
4130 DEF FNlessthanone
4140 [OPT pass%
4150         MOV     r2,#0
4160         CMP     r0,#0
4170         RSBLT   r0,r0,#0
4180         MOVLT   r2,#1
4190         CMP     r0,#sft%
4200         MOVGT   r0,#sft%
4210         CMP     r2,#0
4220         RSBNE   r0,r0,#0
4230 ]
4240 =0
4250 :
4260 DEF PROCerror
4270 SYS "Hourglass_Smash"
4280 MODE 0
4290 PRINT REPORT$;" at line ";STR$(ERL
)
4300 IF FNyes("Again") THEN RUN
4310 ENDPROC
```

Listing Info5

```
  10 REM     >Why? (Info5)
  20 REM By  Andrew Clover
  30 REM For 32-bit machines
  40 REM (c) BBC Acorn User
  50 :
  60 DIM code &4000
  70 ON ERROR VDU7:PRINT REPORT$;" ( li
ne ";ERL;" )":END
  80 FOR pass=4TO6STEP2
  90 O%=code:P%=0
 100 [OPTpass
 110         EQUD    0
 120         EQUD    init
 130         EQUD    quit
 140         EQUD    0
 150         EQUD    title
 160         EQUD    help
 170         EQUD    0
 180         EQUS    (STRING$(16,CHR$0)
)
 190 .error
 200         EQUD 0:EQUS "Unable to cla
im workspace"+CHR$0
 210 .title
 220         EQUS    "Why?"+CHR$0
 230 .help
 240         EQUS    "Why?"+CHR$9+CHR$9
+"1.00 (11 Mar 93)"+CHR$0:Align
 250 .init
 260         STMFD   R13!,{r0-r3 ,R14}
 270         MOV     R0,#6
 280         MOV     R3,#580
 290         SWI     "XOS_Module"
 300         LDMVSFD R13!,{r0-r2 ,R14}
 310         ADRVS   R0,error
 320         ORRVSS  PC,R14,#1<<28
 330         MOV     R0,#ASC("?")
 340         STRB    R0,[R2]
 350         STR     R2,[R12]
 360         MOV     R2,R12
 370         MOV     R0,#&8
 380         ADR     R1,filev
 390         SWI     "XOS_Claim"
 400         MOV     R0,#&9
 410         ADR     R1,argsv
 420         SWI     "XOS_Claim"
 430         MOV     R0,#&A
 440         ADR     R1,bgetv
 450         SWI     "XOS_Claim"
 460         MOV     R0,#&B
 470         ADR     R1,bputv
 480         SWI     "XOS_Claim"
 490         MOV     R0,#&C
 500         ADR     R1,gbpbv
 510         SWI     "XOS_Claim"
 520         MOV     R0,#&D
 530         ADR     R1,findv
 540         SWI     "XOS_Claim"
 550         MOV     R0,#&F
 560         ADR     R1,fscv
 570         SWI     "XOS_Claim"
 580         MOV     R0,#&1D
 590         FNA     (1,upcallv)
 600         SWI     "XOS_Claim"
 610         LDMFD   R13!,{r0-r3 ,PC}^
 620 .quit
 630         STMFD   R13!,{r0-r3 ,R14}
 640         MOV     R2,R12
 650         MOV     R0,#&8
 660         ADR     R1,filev
 670         SWI     "XOS_Release"
 680         MOV     R0,#&9
 690         ADR     R1,argsv
 700         SWI     "XOS_Release"
 710         MOV     R0,#&A
 720         ADR     R1,bgetv
 730         SWI     "XOS_Release"
 740         MOV     R0,#&B
 750         ADR     R1,bputv
 760         SWI     "XOS_Release"
 770         MOV     R0,#&C
 780         ADR     R1,gbpbv
 790         SWI     "XOS_Release"
 800         MOV     R0,#&D
 810         ADR     R1,findv
 820         SWI     "XOS_Release"
 830         MOV     R0,#&F
 840         ADR     R1,fscv
 850         SWI     "XOS_Release"
 860         MOV     R0,#&1D
 870         FNA     (1,upcallv)
 880         SWI     "XOS_Release"
 890         MOV     R0,#7
 900         LDR     R12,[R12]
 910         SWI     "XOS_Module"
 920         LDMFD   R13!,{r0-r3 ,PC}^
 930
 940 .filev
 950         STMFD   R13!,{r0-r4 ,R14}
 960         FNA     (2,filet)
 970         CMP     R0,#255
 980         MOVEQ   R0,#16
 990         B       sget
1000 .argsv
1010         STMFD   R13!,{r0-r4 ,R14}
1020         ADR     R2,argst
1030         B       sget
1040 .bgetv
1050         STMFD   R13!,{r0-r4 ,R14}
1060         ADR     R2,bgett
1070         B       sget
1080 .bputv
1090         STMFD   R13!,{r0-r4 ,R14}
1100         ADR     R2,bputt
1110         B       sget
1120 .gbpbv
1130         STMFD   R13!,{r0-r4 ,R14}
1140         ADR     R2,gbpbt
1150         B       sget
1160 .findv
1170         STMFD   R13!,{r0-r4 ,R14}
1180         ADR     R2,findt
1190         MOV     R0,R0,Lsr#6
1200         B       sget
1210 .fscv
1220         STMFD   R13!,{r0-r4 ,R14}
1230         ADR     R2,fsct
1240         B       sget
1250
1260 .argst
1270   Equs "!@move '&' pointer@!@shrin
k or enlarge '&'@!@!@ensure space for '&
'@!#?@"
1280 .bgett
1290   Equs "#read '&'@"
1300 .bputt
1310   Equs "#write to '&'@"
1320 .gbpbt
1330   Equs "?@write to '&'@write to '&
'@read '&'@read '&'@?@?@?@?@read '%'@rea
d '%'@read '%'#?@"
1340 .findt
1350   Equs "close '&'@open '%' for rea
ding@create '%'@open '%' for reading and
 writing#?@"
1360 .filet
1370   Equs "save '%'@write '%' address
es@write load address of '%'@write exec
address of '%'@write '%' access attribut
es@read details of '%'@delete '%'@create
 '%'@create '%' directory@stamp '%' date
@save '%'@create '%'@load '%'@"
1380   Equs "read details of '%'@load '
%'@read details of '%'@load '%'@read det
aila of '%'@write '%' filetype#?@":Align
1390 .fsct
1400   Equs "set CSD to '%'@set lib to
'%'@!@!@run '%'@cat '%'@exam CSD@cat lib
@exam lib%examine '%'@set options@!@!@!@
!@!@?@!@!@!@!@!@!@close files@shutdown@s
et access of '%'@rename '%'@copy '%'@wip
e '%'@count '%'@!@!@!@?@!#!@"
1410
1420 .sget
1430         LDR     R12,[R12]
1440         CMP     R0,#0
1450         BEQ     sput
1460 .gloop
1470         LDRB    R4,[R2],#1
1480         CMP     R4,#ASC("#")
1490         BEQ     sput
1500         CMP     R4,#ASC("@")
1510         BNE     gloop
1520         SUBS    R0,R0,#1
1530         BNE     gloop
1540 .sput
1550         LDRB    R4,[R2],#1
1560         CMP     R4,#ASC("!")
1570         LDMEQFD R13!,{r0-r4 ,Pc}^
1580         CMP     R4,#ASC("@")
1590         CMPNE   R4,#ASC("#")
1600         BEQ     vend
1610         CMP     R4,#ASC("%")
1620         BLEQ    subst
1630         BEQ     sput
1640         CMP     R4,#ASC("""")
1650         BEQ     sput
1660         CMP     R4,#ASC("&")
1670         BLEQ    handle
1680         STRNEB  R4,[R12],#1
1690         B       sput
1700 .vend
1710         MOV     R4,#0
1720         STRB    R4,[R12]
1730         LDMFD   R13!,{r0-r4 ,PC}^
1740 .subst
1750         LDRB    R4,[R1],#1
1760         CMP     R4,#32
1770         STRPLB  R4,[R12],#1
1780         BPL     subst
1790         MOVS    PC,R14
1800 .handle
1810         STMFD   R13!,{r2 ,R5,R14}
1820         MOV     R0,#7
1830         MOV     R2,R12
1840         MOV     R5,#188
1850         SWI     "XOS_Args"
1860         RSBVC   R2,R5,#188
1870         ADDVC   R12,R12,R2
1880         LDMVCFD R13!,{r2 ,R5,Pc}^
1890         MOV     R5,#ASC("&")
1900         STRB    R5,[R12],#1
1910         MOV     R0,R1
1920         MOV     R1,R12
1930         MOV     R2,#3
1940         SWI     "XOS_ConvertHex2"
1950         MOV     R12,R1
1960         LDMFD   R13!,{r2 ,R5,Pc}^
1970
1980 .upcallv
1990         CMP     R0,#1
2000         CMPNE   R0,#2
2010         MOVNES  PC,R14
2020         STMFD   R13!,{r0-r9 ,R14}
2030         MOV     R4,R2
2040         LDR     R12,[R12]
2050         LDRB    R7,[R12]
2060         CMP     R7,#ASC("?")
2070         LDMEQFD R13!,{r0-r9 ,PC}^
2080         ADD     R7,R12,#228
2090         ADR     R8,s1
2100         BL      copy
2110         MOV     R0,#33
2120         MOV     R2,R7
2130         MOV     R3,#16
2140         SWI     "XOS_FSControl"
2150         LDMVSFD R13!,{r0-r9 ,PC}^
2160         ADD     R7,R12,#260
2170         ADR     R8,s2
2180         BL      copy
2190         CMN     R6,#1
2200         MOVNE   R8,R6
2210         BLNE    copy
2220         MOVNE   R9,#32
2230         STRNEB  R9,[R7],#1
2240         MOV     R9,#ASC("'")
2250         STRB    R9,[R7],#1
2260         MOV     R8,R4
2270         BL      copy
2280         MOV     R9,#39
2290         STRB    R9,[R7],#1
2300         ADR     R8,s3
2310         BL      copy
2320         MOV     R8,R12
2330         BL      copy
2340         ADD     R0,R12,#260
2350         MOV     R1,#%10011
2360         ADD     R2,R12,#228
2370         SWI     "XWimp_ReportError
"
2380         LDMVSFD R13!,{r0-r9 ,PC}^
2390         RSB     R12,R1,#1
2400         LDMFD   R13!,{r0-r9 ,R14}
2410         MOV     R0,R12
2420         MOVS    PC,R14
2430
2440 .s1
2450         EQUS    "Message from "+CH
R$0
2460 .s2
2470         EQUS    "    Please insert
 "+CHR$0
2480 .s3
2490         EQUS    ", to "+CHR$0
2500
2510 .copy
2520         LDRB    R9,[R8],#1
2530         STRB    R9,[R7],#1
2540         CMP     R9,#32
2550         BPL     copy
2560         SUB     R7,R7,#1
2570         MOVS    PC,R14
2580
2590 ]:NEXT
2600 SYS "OS_File",10,"WhyMod",&FFA,,co
de,0%
2610 END
2620
2630 DEFFNA(r,a)
2640 [OPTpass
2650         ADD     r,PC,#(a-P%-8)AND&
FF
2660         ADD     r,r,#(a-P%-8)AND&F
F00
2670 ]:=pass
```

Listing Info6

```
  10 REM     >FindApps (Info6)
  20 REM By  Dave Acton
  30 REM For 32-bit machines
  40 REM (c) BAU July 1993
  50 :
  60 buf_size%=64*1024
  70 DIM buffer% buf_size%,temp% &100
  80 PROCins("adfs::4.$")
  90 REPEAT
 100  INPUT"Scan directory: "dir$
 110  SYS "XOS_File",20,dir$ TO ,,,,,,t
ype
 120 UNTIL type=&1000
 130 PROCins("%.boot_list")
 140 REPEAT
 150  INPUT"Output as: "out$
 160  SYS "XOS_File",11,out$,&FEB
 170  SYS "XOS_File",20,out$ TO ,,,,,,t
ype
 180 UNTIL type=&FEB
 190 PROCins("!Sprites22")
 200 INPUT"Preferred sprite files: "pre
f$
 210 PROCins("Y")
 220 INPUT"Ignore Impression documents:
 "ignore$
 230 ignore_imp=LEFT$(FNuc(ignore$),1)=
"Y"
 240 PRINT"Scanning..."
 250 out%=OPENOUT(out$)
 260 PROCscan(dir$,buffer%,buffer%+buf_
size%)
 270 CLOSE#out%
 280 END
 290 :
 300 DEF PROCscan(dir$,buf_start%,buf_e
nd%)
 310 LOCAL i%,p%,a%
 320 SYS "OS_GBPB",12,dir$,buf_start%,1
024,0,buf_end%-buf_start%,"*" TO ,,,read
%
 330 IF read%>0 THEN
 340  p%=buf_start%
 350  FOR i%=1 TO read%
 360   p%+=24
 370   WHILE ?p%<>0
 380    p%+=1
 390   ENDWHILE
 400   ?p%=13
 410   p%=(p%+4) AND (NOT 3)
 420  NEXT
 430  a%=buf_start%
 440  FOR i%=1 TO read%
 450   CASE a%!20 OF
 460    WHEN &1000
 470     PROCscan(dir$+"."+$(a%+24),p%,
buf_end%)
 480    WHEN &2000:
```

```
  490      SYS "OS_FSControl",37,dir$+"."
+$(a%+24),temp%,,,&400 TO ,,,,,unused%
  500      temp%?(&400-unused%)=13
  510      app$=$temp%
  520      PRINT"Application: ";app$;" ";
  530      skip_imp=FALSE
  540      IF ignore_imp THEN
  550       SYS "XOS_File",20,app$+".!run
" TO is_run
  560       IF is_run=1 THEN
  570        in%=OPENIN(app$+".!run")
  580        WHILE NOT EOF#in% AND NOT sk
ip_imp
  590         IF FNuc(FNstrip(GET$#in%))=
"RUNIMPRESSION" THEN skip_imp=TRUE
  600        ENDWHILE
  610        CLOSE#in%
  620       ENDIF
  630      ENDIF
  640      IF skip_imp THEN
  650       PRINT"(Impression)"
  660      ELSE
  670       SYS "XOS_File",20,app$+".!boo
t" TO is_boot,,,,,boot_type
  680       sp$=pref$
  690       SYS "XOS_File",20,app$+"."+sp
$ TO ,,,,,sprite_type
  700       IF sprite_type<>&FF9 THEN
  710        sp$="!sprites"
  720        SYS "XOS_File",20,app$+"."+s
p$ TO ,,,,,sprite_type
  730       ENDIF
  740       IF is_boot=1 OR sprite_type=1
 THEN
  750        BPUT#out%,"set obey$dir "+ap
p$
  760        IF is_boot=1 THEN
  770         IF boot_type=&FEB BPUT#out%
,"obey ";
  780         BPUT#out%,"<obey$dir>.!boot
"
  790        ENDIF
  800        IF sprite_type=&FF9 BPUT#out
%,"iconsprites <obey$dir>."+sp$
  810       ENDIF
  820       PRINT
  830      ENDIF
  840    ENDCASE
  850    a%=(a%+28+LEN($(a%+24))) AND (NO
T 3)
  860  NEXT
  870 ENDIF
  880 ENDPROC
  890 :
  900 DEF PROCins(i$)
  910 LOCAL i%
  920 FOR i%=1 TO LEN(i$)
  930  SYS "OS_Byte",138,0,ASCMID$(i$,i%
)
  940 NEXT
  950 ENDPROC
  960 :
  970 DEF FNuc(a$)
  980 LOCAL b$,i%
  990 b$=""
 1000 FOR i%=1 TO LEN(a$)
 1010  c%=ASCMID$(a$,i%)
 1020  IF c%>=ASC"a" AND c%<=ASC"z" THEN
 c%-=32
 1030  b$+=CHR$c%
 1040 NEXT
 1050 =b$
 1060 :
 1070 DEF FNstrip(a$)
 1080 WHILE ASC(a$)=32
 1090  a$=MID$(a$,2)
 1100 ENDWHILE
 1110 WHILE RIGHT$(a$)=" "
 1120  a$=LEFT$(a$)
 1130 ENDWHILE
 1140 =a$
```

Listing Info7

```
   10 REM      >Sunrise (Info7)
   20 REM By  P E Marshall
   30 REM For all machines
   40 REM (c) BAU July 1993
   50 :
   60 MODE 0
   70 PRINT''"Sunrise and Sunset Calcula
tor"
   80 VDU 14
   90 DIM days(12)
  100 FOR i%=0 TO 12
  110  READ days(i%)
  120 NEXT
  130 INPUT''"Enter Day,Month (press RET
URN twice for today) ",day,month
  140 IF day=0 OR month=0 THEN PROCtoday
 ELSE PRINT''"Day ";day;"  Month ";mont
h
  150 PRINT''TAB(20)"GMT","Local"," ","G
MT","Local"
  160 PROCprocess("London",51,30,0,5,0)
  170 PROCprocess("Antigua",17,10,61,0,4
)
  180 PRINT'''"(Daylight saving time is
not allowed for in local time)"'''
  190 END
  200 :
  210 DEF PROCprocess(name$,latdeg,latmi
n,longdeg,longmin,adjust)
  220 lat=RAD(latdeg+latmin/60)
  230 long=longdeg+longmin/60
  240 PROCdeclination
  250 PROCrise_set
  260 PRINT'name$,;
  270 IF flag=1 THEN PRINT"No sunrise",;
 ELSE PRINT"Sunrise ",FNtime(rise),FNtim
e(rise-adjust),;
  280 IF flag=2 THEN PRINT"No sunset";
ELSE PRINT"Sunset  ",FNtime(set),FNtime(
set-adjust)
  290 ENDPROC
  300 :
  310 DEF PROCdeclination
  320 x=2*PI*(days(month)+day)/365
  330 REM declination
  340 d=0.456-22.915*COS(x)-0.43*COS(2*x
)-0.156*COS(3*x)+3.83*SIN(x)+0.06*SIN(2*
x)-0.082*SIN(3*x)
  350 REM equation of time
  360 e=0.008+0.51*COS(x)-3.197*COS(2*x)
-0.106*COS(3*x)-0.15*COS(4*x)-7.317*SIN(
x)-9.471*SIN(2*x)-0.391*SIN(3*x)-0.242*S
IN(4*x)
  370 de=RAD(d)
  380 ENDPROC
  390 :
  400 DEF PROCrise_set
  410 flag=0
  420 y=TAN(de)*TAN(lat)
  430 IF y>1 THEN flag=1:ENDPROC
  440 IF y<-1 THEN flag=2:ENDPROC
  450 ac=DEG(-ATN(y/SQR(-y*y+1))+1.57076
33)
  460 rise=long/15+ac/15:rise=rise-e/60
  470 set=long/15-ac/15:set=set-e/60
  480 IF rise>24 THEN rise=rise-24
  490 IF rise<0 THEN rise=rise+24
  500 IF set>24 THEN set=set-24
  510 IF set<0 THEN set=set+24
  520 ENDPROC
  530 :
  540 DEF FNtime(t)
  550 t1=INT(t)
  560 t2=(t-t1)*60
  570 t2=INT(t2+0.5)
  580 t$=STR$(t1)+":":IF t2<10 THEN t$=t
$+"0"
  590 =t$+STR$(t2)
  600 :
  610 DEF PROCtoday
  620 PRINT'"Taking today - ";LEFT$(TIME
$,15)
  630 day=VAL(MID$(TIME$,5,2))
  640 month=INSTR("..JanFebMarAprMayJunJ
ulAugSepOctNovDec",MID$(TIME$,8,3))/3
  650 ENDPROC
  660 :
  670 DATA 0,0,31,59,90,120,151,181,212,
243,273,304,334
```

Listing Info8

```
   10 REM      >MetricDat (Info8)
   20 REM      Create files for !Metric
   30 REM      Files created by P E Marsh
all
   40 REM For 32-bit machines
   50 REM (c) BAU July 1993
   60 :
   70 DIM q% &100,w% 64*1024
   80 REPEAT
   90  READ file$
  100  IF file$<>"*" THEN
  110   PRINT file$
  120   READ type%,olen%
  130   IF type%=&FFF OR type%=&FFE OR t
ype%=&FEB THEN
  140    out%=OPENOUT(file$)
  150    REPEAT
  160     READ line$
  170     IF line$<>"*" BPUT#out%,line$
  180    UNTIL line$="*"
  190    CLOSE#out%
  200    SYS "OS_File",18,file$,type%
  210   ELSE
  220    line%=0
  230    d$=""
  240    i%=0
  250    WHILE i%<olen%
  260     b$=FNc
  270     IF b$>="a" AND b$<="z" THEN
  280      off%=-EVAL("&"+FNc+FNc)
  290      FOR k%=0 TO (ASC(b$)-ASC"a"+2
)
  300       w%?i%=w%?(i%+off%)
  310       i%+=1
  320      NEXT
  330     ELSE
  340      w%?i%=EVAL("&"+b$+FNc)
  350      i%+=1
  360     ENDIF
  370    ENDWHILE
  380    SYS "OS_File",10,file$,type%,,w
%,w%+olen%
  390   ENDIF
  400  ENDIF
  410 UNTIL file$="*"
  420 END
  430 :
  440 DEF FNc
  450 LOCAL c$
  460 IF d$="" THEN
  470  READ d$,ch$
  480  line%+=1
  490  $q%=d$
  500  SYS "OS_CRC",0,q%,q%+LEN(d$),1 TO
 crc%
  510  IF crc%<>EVAL("&"+ch$) PRINT"Erro
r in data line ";line%:END
  520 ENDIF
  530 c$=LEFT$(d$,1)
  540 d$=MID$(d$,2)
  550 =c$
  560 :
  570 DATA "!Run",&FEB,&70
  580 DATA SET Metric$Dir <Obey$Dir>
  590 DATA IconSprites <Metric$Dir>.!Spr
ites
  600 DATA WimpSlot -min 80K -max 80K
  610 DATA <Metric$Dir>.!RunImage
  620 DATA
  630 DATA *
  640 DATA "!Sprites",&FF9,&6B8
  650 DATA 030000010a04BC060000D4,6364
  660 DATA 020000216D6574726963a16,C465
  670 DATA 000004e1Cb0D07a282Ca2C8,D235
  680 DATA 00100000Ca3455555555a04,D623
  690 DATA d07b0Da48CCCCCCCCa04d07,1105
  700 DATA b0Dq14b14C7c29c06c06q14,BB6E
  710 DATA f28a2Bc06d09q14b6477777,404C
  720 DATA 777a04d07b0DeB4eBBk0En1,14E
  730 DATA Br3CC7a9Ca04c06c0CeB4bB,67A4
  740 DATA 8e08g14jF4q14c3Cm27cF0r,2717
  750 DATA B4FFFFFFFFa04d07j0Dv19z,2866
  760 DATA 31z4Dz69y85aF3aF6c06d0B,7B92
  770 DATA q14zC5zE0zFCzFFzFFbFF04,8C2D
  780 DATA 010000736D216D657472696,FAAA
  790 DATA 3aC102aC508eC90BaD12CaD,DBC1
  800 DATA 598aD90CaDDC7CCCCCCCCa0,2305
  810 DATA 4CCa0DC7CC7CCCCCb05i0Cb,A4B7
  820 DATA 1877777777a047777071FAj,7634
  830 DATA 18C7a39a04CCC7c48b47a4B,A5BD
  840 DATA e0Cf60zFFrFFg6EF0z3At56,535F
  850 DATA D4aF569635F6D6574726963,F306
  860 DATA aFC04aFF21eBFbC72CaFCa0,FF7C
  870 DATA 4001BjC8fE9aE7373717117,E19D
  880 DATA 7111177171771b083773f14,9B8E
  890 DATA 771177771771a04d14r3C17,42C0
  900 DATA 11111111a04d07d3Cm14r28,A41D
  910 DATA 1771q14q14z28gCBi78C7CC,EBBA
  920 DATA CCCCCCa047Cq14n14b2Ck28,E154
  930 DATA 7Cb147Cq14q14m28r8C2722,9BDA
  940 DATA 222222a0472z28bB4C7a8Ba,AA3C
  950 DATA 04kB4q14a28cB5zDCnF0177,27C1
  960 DATA 1q14e14jB4q14g3CaFBb05c,94BD
  970 DATA 09q14aFCp28fF0z28g28g89,8BDC
  980 DATA f92000000,F00D
  990 DATA *
```

Listing Info9

```
   10 REM      >!RunImage (Info9)
   20 REM      Metric/Imperial Units Conv
ersion
   30 REM By  P E Marshall
   40 REM For 32-bit machines
   50 REM (c) BAU July 1993
   60 :
   70 ON ERROR PROCerror
   80 PROCinit_prog
   90 PROCinit_wimp
  100 PROCclear_icons
  110 REPEAT
  120  SYS "Wimp_Poll",%110011,blk% TO r
eason,ptr%
  130  CASE reason OF
  140   WHEN 2:SYS "Wimp_OpenWindow",,pt
r%
  150   WHEN 3:SYS "Wimp_CloseWindow",,p
tr% :active=FALSE
  160   WHEN 6:PROCclicked
  170   WHEN 8:PROCkeypress
  180   WHEN 9:PROCprocess_menu
  190   WHEN 17,18:IF ptr%!16=0 THEN qui
t=TRUE
  200  ENDCASE
  210 UNTIL quit
  220 SYS "Wimp_CloseDown"
  230 END
  240 :
  250 DEF PROCinit_wimp
  260 quit=FALSE
  270 DIM blk% 1024,menu1% 512,menu2% 51
2,titlebuf 32
  280 SYS "Wimp_Initialise",200,&4B53415
4,"Metric" TO version,task
  290 PROCinfo
  300 PROCsetup_menu1
  310 PROCsetup_menu2
  320 PROCiconbar
  330 ENDPROC
  340 :
  350 DEF FNcreate(ww,wh,t$,wf,wb,flags,
addr)
  360 blk%!24=-1:blk%!28=flags
  370 blk%?32=7:blk%?33=2
  380 blk%?34=wf:blk%?35=wb
  390 blk%?36=3:blk%?37=2
  400 blk%?38=12:blk%?39=0
  410 blk%!40=0:blk%!44=wh
  420 blk%!48=ww:blk%!52=0
  430 IF addr=0 blk%!56=&3D ELSE blk%!56
=&13D
  440 blk%!60=0:blk%!64=0
  450 blk%!68=650:blk%!70=244
  460 IF addr=0 THEN
  470  $(blk%+72)=t$
  480 ELSE
  490  $addr=t$
  500  blk%!72=addr
  510  blk%!76=-1
  520  blk%!80=32
  530 ENDIF
  540 blk%!84=0
  550 SYS "Wimp_CreateWindow",,blk% TO h
andle
  560 =handle
  570 :
  580 DEF PROCsetup_menu1
  590 flags=&7000021
  600 p%=menu1%
  610 PROCmenu_header("Metric",14)
  620 FOR i%=0 TO 11
  630  PROCmenu_item(&00,-1,flags,cat$(i
%))
  640 NEXT
  650 PROCmenu_item(&02,-1,flags,"Torque
")
  660 PROCmenu_item(&00,menu2%,flags,"Fi
gures")
  670 PROCmenu_item(&00,info_window,flag
s,"Info")
  680 PROCmenu_item(&80,-1,flags,"Quit")
  690 ENDPROC
  700 :
  710 DEF PROCsetup_menu2
  720 p%=menu2%
  730 PROCmenu_header("1 to 8",6)
  740 p%!0=&84
  750 p%!4=-1
  760 p%!8=&7000119
  770 p%!12=places%
  780 p%!16=-1
  790 p%!20=2
  800 ENDPROC
  810 :
  820 DEF PROCmenu_header(t$,w)
  830 $p%=t$
  840 p%!12=&70207
  850 p%!16=w*16
  860 p%!20=44
  870 p%!24=0
  880 p%+=28
  890 ENDPROC
  900 :
  910 DEF PROCmenu_item(a%,b%,c%,t$)
  920 p%!0=a%
  930 p%!4=b%
  940 p%!8=c%
  950 $(p%+12)=t$
  960 p%+=24
  970 ENDPROC
  980 :
  990 DEF PROCcreate_icon(windhan,addr,m
inx,maxx,miny,t$,flags)
 1000 blk%!0=windhan
 1010 blk%!4=minx
 1020 blk%!8=miny
 1030 blk%!12=maxx
 1040 blk%!16=miny+56
 1050 blk%!20=flags
 1060 IF addr=0 THEN
 1070  $(blk%+24)=t$
 1080 ELSE
 1090  IF t$<>"" $addr=t$
 1100  blk%!24=addr
 1110  blk%!28=-1
 1120  blk%!32=line_len
 1130 ENDIF
 1140 SYS "Wimp_CreateIcon",,blk%
 1150 ENDPROC
 1160 :
 1170 DEF PROCset_icon(icon)
 1180 blk%!0=main_window
 1190 blk%!4=icon
 1200 blk%!8=00000
 1210 blk%!12=0
 1220 SYS "Wimp_SetIconState",,blk%
 1230 ENDPROC
 1240 :
 1250 DEF PROCopenup(handle,x,y,w,h)
 1260 blk%!0=handle
 1270 blk%!4=x:blk%!8=y-h
 1280 blk%!12=x+w:blk%!16=y
 1290 blk%!20=0:blk%!24=0
 1300 blk%!28=-1
 1310 SYS "Wimp_OpenWindow",,blk%
 1320 ENDPROC
 1330 :
 1340 DEF PROCclicked
 1350 button=ptr%!8
 1360 icon%=ptr%!16
 1370 IF (button AND 4) AND icon%=iconba
r AND select<13 THEN PROCnew_window
 1380 IF button AND 2 THEN PROCcreate_me
nu(menu1%,ptr%!0-64,-ptr%!4*(icon%<>icon
bar)-(icon%=iconbar)*824)
 1390 ENDPROC
 1400 :
 1410 DEF PROCcreate_menu(m%,x%,y%)
 1420 FOR i%=0 TO 12
 1430  a%=menu1%+28+24*i%
 1440  !a%=!a% AND (NOT 1)
 1450  IF i%=select THEN !a%+=1
 1460 NEXT
 1470 cur_menu%=m%
 1480 menu_x%=x%
 1490 menu_y%=y%
 1500 SYS "Wimp_CreateMenu",,m%,x%,y%
 1510 ENDPROC
 1520 :
 1530 DEF PROCkeypress
 1540 IF blk%?24=13 THEN
 1550  unit=(blk%?4)+1
 1560  PROCrecalc
 1570 ELSE
 1580  SYS "Wimp_ProcessKey",blk%?24
 1590 ENDIF
 1600 ENDPROC
 1610 :
 1620 DEF PROCprocess_menu
 1630 SYS "Wimp_GetPointerInfo",,blk%+25
6
 1640 CASE ptr%!0 OF
 1650  WHEN 0,1,2,3,4,5,6,7,8,9,10,11,12
:
 1660   select=ptr%!0
 1670   PROCnew_window
 1680  WHEN 13:PROCdecplaces
 1690  WHEN 15:quit=TRUE
 1700 ENDCASE
 1710 IF ((blk%!264) AND 1)>0 PROCcreate
_menu(cur_menu%,menu_x%,menu_y%)
 1720 ENDPROC
 1730 :
 1740 DEF PROCshut(handle)
 1750 blk%!0=handle
 1760 SYS "Wimp_CloseWindow",,blk%
 1770 ENDPROC
 1780 :
 1790 DEF PROCerror
 1800 !blk%=0
 1810 $(blk%+4)=REPORt$+" at line "+STR$
ERL+CHR$0
 1820 SYS "Wimp_ReportError",blk%,1,"Met
```

```
ric"
 1830 SYS "Wimp_CloseDown"
 1840 END
 1850 ENDPROC
 1860 :
 1870 DEF PROCiconbar
 1880 blk%!0=-1
 1890 blk%!4=0
 1900 blk%!8=0
 1910 blk%!12=68
 1920 blk%!16=68
 1930 blk%!20=&3002
 1940 $(blk%+24)="!metric"
 1950 SYS "Wimp_CreateIcon",,blk% TO ico
nbar
 1960 ENDPROC
 1970 :
 1980 DEF PROCdecplaces
 1990 dec=VAL($places%)
 2000 IF dec=0 OR dec>8 THEN VDU7:dec=4:
$places%="4"
 2010 @%=EVAL("&01000"+CHR$(dec+48)+"0D"
)
 2020 IF active THEN PROCrecalc
 2030 ENDPROC
 2040 :
 2050 DEF PROCinit_prog
 2060 active=FALSE
 2070 unit=1
 2080 max_quant=16
 2090 max_units=32
 2100 line_len=24
 2110 buf_size=max_units*line_len
 2120 DIM iconaddr max_quant*buf_size,la
beladdr max_quant*buf_size
 2130 DIM units$(max_units),factor(max_u
nits)
 2140 DIM value(max_units,max_quant)
 2150 DIM places% 4
 2160 DIM cat$(12)
 2170 cat$()="Length","Area","Volume","W
eight","Density","Pressure","Energy","Fo
rce","Power","Velocity","Temperature","I
lluminance","Torque"
 2180 $places%="4"
 2190 PROCdecplaces
 2200 ENDPROC
 2210 :
 2220 DEF PROCdeficons(unit$(),imp,met)
 2230 top=-140
 2240 x=20:y=top
 2250 FOR i%=1 TO imp+met
 2260  IF i%=imp+1 THEN x=620:y=top
 2270  PROCcreate_icon(main_window,FNico
naddr(i%),x,x+240,y,"",&700F13D)
 2280  y-=64
 2290 NEXT
 2300 x=280
 2310 y=top
 2320 FOR i%=1 TO imp+met
 2330  IF i%=imp+1 THEN x=880:y=top
 2340  PROCcreate_icon(main_window,FNlab
eladdr(i%),x,x+320,y,unit$(i%),&17000111
)
 2350  y-=64
 2360 NEXT
 2370 PROCcreate_icon(main_window,0,20,6
00,-64,"Imperial",&8000003D)
 2380 PROCcreate_icon(main_window,0,620,
1200,-64,"Metric",&8000003D)
 2390 ENDPROC
 2400 :
 2410 DEF FNiconaddr(a%)
 2420 =iconaddr+(select*buf_size)+(a%*li
ne_len)
 2430 :
 2440 DEF FNlabeladdr(a%)
 2450 =labeladdr+(select*buf_size)+(a%*l
ine_len)
 2460 :
 2470 DEF PROCinfo
 2480 DIM infotext 128,infotitle 32:p%=i
nfotext
 2490 info_window=FNcreate(650,-244,"Abo
ut This Program",7,1,%10010011,infotitle
)
 2500 y=-60
 2510 FOR i%=0 TO 3
 2520  READ t$,$p%
 2530  PROCcreate_icon(info_window,0,16,
160,y,t$,&17000211)
 2540  PROCcreate_icon(info_window,p%,17
0,640,y,"",&700013D)
 2550  y-=60
 2560  p%+=32
 2570 NEXT
 2580 ENDPROC
 2590 :
 2600 DEF PROCrecalc
 2610 value=FNeval($(FNiconaddr(unit)))
 2620 IF select=10 THEN PROCcalctemp ELS
E PROCconvert(value,unit)
 2630 ENDPROC
 2640 :
 2650 DEF FNeval(e$)
 2660 LOCAL v
 2670 LOCAL ERROR
 2680 ON ERROR LOCAL RESTORE ERROR:=0
 2690 v=EVAL(e$)
 2700 RESTORE ERROR
 2710 =v
 2720 :
 2730 DEF PROCcalctemp
 2740 CASE unit OF
 2750  WHEN 1:
 2760   value(2,select)=5/9*(value-32)
 2770   value(3,select)=5/9*(value-32)+2
73.15
 2780  WHEN 2:
 2790   value(1,select)=value*9/5+32
 2800   value(3,select)=value+273.15
 2810  WHEN 3:
 2820   value(1,select)=(value-273.15)*9
/5+32
 2830   value(2,select)=value-273.15
 2840 ENDCASE
 2850 value(unit,select)=value
 2860 FOR i%=1 TO 3
 2870  $(FNiconaddr(i%))=STR$(value(i%,s
elect))
 2880  PROCset_icon(i%-1)
 2890 NEXT
 2900 IF value(3,select)<0 THEN VDU 7
 2910 ENDPROC
 2920 :
 2930 DEF PROCconvert(value,unit)
 2940 temp=value*factor(unit)
 2950 IF unit<=no_imps THEN
 2960  FOR i%=1 TO no_imps
 2970   value(i%,select)=temp/factor(i%)
 2980  NEXT
 2990  value(baseM,select)=value(baseI,s
elect)*convert
 3000  temp=value(baseM,select)/factor(b
aseM)
 3010  FOR i%=no_imps+1 TO no_imps+no_me
tric
 3020   value(i%,select)=temp/factor(i%)
 3030  NEXT
 3040 ELSE
 3050  FOR i%=no_imps+1 TO no_imps+no_me
tric
 3060   value(i%,select)=temp/factor(i%)
 3070  NEXT
 3080  value(baseI,select)=value(baseM,s
elect)/convert
 3090  temp=value(baseI,select)/factor(b
aseI)
 3100  FOR i%=1 TO no_imps
 3110   value(i%,select)=temp/factor(i%)
 3120  NEXT
 3130 ENDIF
 3140 FOR i%=1 TO no_imps+no_metric
 3150  IF value(i%,select)=0 THEN $(FNic
onaddr(i%))="" ELSE $(FNiconaddr(i%))=ST
R$(value(i%,select))
 3160  PROCset_icon(i%-1)
 3170 NEXT
 3180 ENDPROC
 3190 :
 3200 DEF PROCclear_icons
 3210 FOR select=0 TO max_quant-1
 3220  FOR i%=0 TO max_units
 3230   $(FNiconaddr(i%))=""
 3240  NEXT
 3250 NEXT
 3260 select=0
 3270 ENDPROC
 3280 :
 3290 DEF PROCnew_window
 3300 IF active THEN !blk%=main_window:S
YS "Wimp_DeleteWindow",,blk%
 3310 RESTORE
 3320 REPEAT
 3330  READ c$
 3340 UNTIL c$=cat$(select)
 3350 READ no_imps,no_metric,baseI,baseM
,convert
 3360 FOR i%=1 TO no_imps+no_metric
 3370  READ factor(i%)
 3380 NEXT
 3390 units$(0)=cat$(select)
 3400 FOR i%=1 TO no_imps+no_metric
 3410  READ units$(i%)
 3420 NEXT
 3430 a%=no_imps
 3440 b%=no_metric
 3450 IF a%<b% THEN SWAP a%,b%
 3460 y%=a%*64+100
 3470 main_window=FNcreate(1240,-y%,unit
s$(0),7,1,%11111,titlebuf)
 3480 PROCdeficons(units$(),no_imps,no_m
etric)
 3490 PROCopenup(main_window,0,980,1240,
y%)
 3500 active=TRUE
 3510 ENDPROC
 3520 :
 3530 DATA "Name:","Metric"
 3540 DATA "Purpose:","Units conversion"
 3550 DATA "Author:","P.E.Marshall,  Ant
igua W.I."
 3560 DATA "Version:","1.11 (19 Apr 1993
)"
 3570 :
 3580 DATA "Length"
 3590 DATA 8,5,2,10,25.4
 3600 DATA 0.001,1,12,36,63360,72,72960,
72913.24
 3610 DATA 0.001,1,10,1E3,1E6
 3620 DATA "milli-inch ('thou')","inch",
"foot","yard","mile","fathom","UK nautic
al mile","Int. nautical mile"
 3630 DATA "micrometre (micron)","millim
etre","centimetre","metre","kilometre"
 3640 :
 3650 DATA "Area"
 3660 DATA 5,5,1,6,645.160
 3670 DATA 1,144,1296,4.0144896E9,627264
0
 3680 DATA 1,100,1E6,1E10,1E12
 3690 DATA "square inch","square foot","
square yard","square mile","acre"
 3700 DATA "square mm","square cm","squa
re metre","hectare","square Km"
 3710 :
 3720 DATA "Volume"
 3730 DATA 7,5,1,8,16.387064
 3740 DATA 1,1728.0,46656,1.73386993,34.
6773986,277.41919,231.0
 3750 DATA 1,1E3,1E6,1,1E3
 3760 DATA "cubic inch","cubic foot","cu
bic yard","UK fluid ounce","UK pint","UK
 gallon","US gallon"
 3770 DATA "cubic centimetre","cubic dec
imetre","cubic metre","millilitre","litr
e"
 3780 :
 3790 DATA "Weight"
 3800 DATA 7,5,3,10,28.349523125
 3810 DATA 2.2857143E-3,1.097143,1,16,17
92,35840,32000
 3820 DATA 0.001,0.2,1,1E3,1E6
 3830 DATA "grain","(ounce troy)","ounce
 Avoir.","pound","hundredweight","UK ton
","short (US) ton"
 3840 DATA "milligram","carat","gram","k
ilogram","metric tonne"
 3850 :
 3860 DATA "Density"
 3870 DATA 4,3,1,5,27.6799
 3880 DATA 1, 5.787037E-4,0.048011012,3.
60478181E-3
 3890 DATA 1,1E-3,1
 3900 DATA "lb/inchRND","lb/footRND","UK
 ton/yardRND","lb/ UK gal."
 3910 DATA "gram/cm.RND","Kg/metreRND","
Kg/ litre"
 3920 :
 3930 DATA "Pressure"
 3940 DATA 5,8,1,11,0.0689476
 3950 DATA 1,6.9444444E-3,15.55555556,0.
49115415,0.036127291
 3960 DATA 0.9806648,1E-5,1E-2,1E-2,1E-3
,1,1.3332244E-3,1.0132505
 3970 DATA "lb /sq.inch","lb /sq.foot","
ton /sq.foot","inch of Hg","inch of HRAD
O"
 3980 DATA "kg./sq.cm","newton/sq.met","
kilonewton/sq.met","kilopascal","milliba
rs","bar","mm of Hg","atmosphere"
 3990 :
 4000 DATA "Energy"
 4010 DATA 6,3,2,7,1.35582
 4020 DATA 0.031080822,1,778.17114,19799
97.3,2.6552197E6,77817114
 4030 DATA 1,1E3,1E6
 4040 DATA "foot poundal","foot pound-fo
rce","BTU","horsepower/hour","kilowatt/h
our","therm"
 4050 DATA "joule","kilojoule","megajoul
e"
 4060 :
 4070 DATA "Force"
 4080 DATA 4,2,2,5,4.44822
 4090 DATA 0.0625,1,0.031080972,2240
 4100 DATA 1,1000
 4110 DATA "ounce-force","pound-force","
poundal","UK ton-force"
 4120 DATA "newton","kilonewton"
 4130 :
 4140 DATA "Power"
 4150 DATA 2,2,1,3,745.7
 4160 DATA 1,1.81818183E-3
 4170 DATA 1,1
 4180 DATA "horsepower","ft. pound-force
/sec"
 4190 DATA "watts","joules/sec"
 4200 :
 4210 DATA "Velocity"
 4220 DATA 3,2,1,4,0.3048
 4230 DATA 1,1.46667,1.68888889
 4240 DATA 1,0.277777778
 4250 DATA "feet / sec.","miles / hour",
"UK knot"
 4260 DATA "metre / sec.","Km / hour"
 4270 :
 4280 DATA "Temperature"
 4290 DATA 1,2,0,0,0
 4300 DATA 0,0,0
 4310 DATA "POINT( Fahrenheit"
 4320 DATA "POINT( Celsius","POINT( Kelv
in"
 4330 :
 4340 DATA "Illuminance"
 4350 DATA 2,2,1,3,10.7639
 4360 DATA 1,1
 4370 DATA 1,1
 4380 DATA "foot candle","lumen/sq.foot.
"
 4390 DATA "lux","lumen/sq.metre"
 4400 :
 4410 DATA "Torque"
 4420 DATA 5,3,3,7,1.35582
 4430 DATA 0.052083333,0.083333333,1,0.0
31080972,2240
 4440 DATA 0.01,1,1000
 4450 DATA "ounce-force inch","pound-for
ce inch","pound-force foot","poundal foo
t","ton-force foot"
 4460 DATA "newton centimetre","newton m
etre","kilonewton metre"
```

Listing Info10

```
   10 REM    >Metric8 (Info10)
   20 REM    Metric/Imperial Units Conv
ersion
   30 REM By  P E Marshall
   40 REM For 8-bit machines
   50 REM (c) BAU July 1993
   60 :
   70 MODE 7
   80 PROCinit_prog
   90 mode=1
  100 done=FALSE
  110 ON ERROR PROCerr
  120 REPEAT
  130  IF mode=1 AND NOT done THEN unit=
1:select=FNmenu:mode=2:IF select=13 done
=TRUE
  140  IF mode=2 AND select>0 AND select
<13 AND NOT done PROCmain:mode=1
  150 UNTIL done
  160 PROCend
  170 END
  180 :
  190 DEF PROCend
  200 CLS
  210 *FX 4,0
  220 ENDPROC
  230 :
  240 DEF PROCerr
  250 IF ERR=17 mode=1:done=INKEY-1:ENDP
ROC
  260 IF mode=1 PROCreport
  270 ENDPROC
  280 :
  290 DEF PROCreport
  300 REPORT
  310 PRINT" at line ";ERL
  320 END
  330 ENDPROC
  340 :
  350 DEF PROCmain
  360 PROCsetup
  370 PROCdisplay
  380 REPEAT
  390  PROCshow_values
  400  PROCinput
  410  IF entry$<>"" PROCconvert(EVAL(en
try$),unit)
  420 UNTIL FALSE
  430 ENDPROC
  440 :
  450 DEF PROCdisplay
  460 CLS
  470 VDU131,157,132:PRINT" Imperial Uni
ts"'
  480 FOR i%=1 TO no_imps
  490  PRINTTAB(20)units$(i%)
  500 NEXT
  510 PRINTTAB(0,12);
  520 VDU 131,157,132:PRINT" Metric Unit
s"'
  530 FOR i%=no_imps+1 TO no_imps+no_met
ric
  540  PRINTTAB(20)units$(i%)
  550 NEXT
  560 PRINTTAB(0,24);:VDU129,157,135:PRI
NTunits$(0);" Conversion";
  570 ENDPROC
  580 :
  590 DEF PROCshow_values
  600 y%=2
  610 FOR i%=1 TO no_imps
  620  PRINTTAB(2,y%)value(i%,select)
  630 y%=y%+1
  640 NEXT
  650 y%=14
  660 FOR i%=no_imps+1 TO no_imps+no_met
ric
  670  PRINTTAB(2,y%)value(i%,select)
  680 y%=y%+1
  690 NEXT
  700 ENDPROC
  710 :
  720 DEF PROCinput
  730 entry$=""
  740 PROChi
  750 REPEAT
  760 k%=GET
  770 IF entry$<>"" THEN 820
  780 IF k%=138 AND unit<no_imps+no_metr
ic THEN unit=unit+1:PROChi
  790 IF k%=139 AND unit>1 THEN unit=uni
t-1:PROChi
  800 IF k%=136 AND figs%<8 THEN figs%=f
igs%+1:PROCdecplaces
  810 IF k%=137 AND figs%>1 THEN figs%=f
igs%-1:PROCdecplaces
  820 IF k%>31 AND k%<127 THEN entry$=en
try$+CHR$(k%):PRINTCHR$(k%);
  830 IF k%=127 AND LEN(entry$)>0 THEN e
ntry$=LEFT$(entry$,LEN(entry$)-1):VDU8,3
2,8
  840 IF LEN entry$=1 THEN PRINTTAB(6,hl
t%)SPC(12);TAB(6,hlt%);
  850 UNTIL k%=13 OR k%=136 OR k%=137
  860 ENDPROC
  870 :
  880 DEF PROChi
  890 IF unit>no_imps THEN hlt%=unit+13-
no_imps ELSE hlt%=unit+1
  900 PRINTTAB(1,old%)"   "
  910 PRINTTAB(1,hlt%)CHR$132;CHR$157;CH
R$135
  920 PRINTTAB(5,hlt%);
  930 old%=hlt%
  940 ENDPROC
  950 :
  960 DEF PROCinit_prog
  970 unit=1
  980 old%=2
  990 max_quant=16
 1000 max_units=32
 1010 line_len=24
 1020 DIM units$(max_units),factor(max_u
nits),value(max_units,max_quant)
 1030 figs%=3
 1040 PROCdecplaces
 1050 *FX 4,1
 1060 ENDPROC
 1070 :
 1080 DEF FNmenu
 1090 CLS
 1100 PRINT
 1110 at%=@%
 1120 @%=10
 1130 FOR i%=3 TO 4
 1140  VDU 141,127+i%
 1150  PRINT"Imperial / Metric Conversio
ns"
 1160 NEXT
 1170 RESTORE 1330
 1180 PRINT'
 1190 FOR i%=1 TO 12
 1200 READ a$
 1210 PRINTTAB(4)CHR$134;a$;" ";CHR$131;
STRING$(16-LEN(a$),".");" ";CHR$135;STR$
i%
```

```
 1220 NEXT
 1230 PRINTTAB(4,23)CHR$133;"No. of figu
res";CHR$131;"... ";CHR$135;"Cursor [ ]"
 1240 PRINTTAB(4,24)CHR$133;"Select unit
";CHR$131;"...... ";CHR$135;"Cursor v ^"
;
 1250 PRINTTAB(4,22)CHR$129;"Exit progra
m ";CHR$131;".... ";CHR$135;"Shift/ESC"
 1260 REPEAT
 1270  PRINTTAB(5,19)"Enter choice"SPC6
 1280  INPUTTAB(18,19)""s%
 1290 UNTIL s%>=0 AND s%<13
 1300 @%=at%
 1310 =s%
 1320 :
 1330 DATA "Length","Area","Volume","Wei
ght","Density","Pressure","Energy"
 1340 DATA "Force","Power","Velocity","T
emperature","Illuminance"
 1350 :
 1360 DEF PROCdecplaces
 1370 @%=EVAL("&01000"+CHR$(figs%+48)+"0
D")
 1380 ENDPROC
 1390 :
 1400 DEF PROCcalctemp
 1410 IF unit=1 THEN value(2,select)=5/9
*(value-32):value(3,select)=5/9*(value-3
2)+273.15
 1420 IF unit=2 THEN value(1,select)=val
ue*9/5+32:value(3,select)=value+273.15
 1430 IF unit=3 THEN value(1,select)=(va
lue-273.15)*9/5+32:value(2,select)=value
-273.15
 1440 value(unit,select)=value
 1450 IF value(3,select)<0 THEN VDU 7
 1460 ENDPROC
 1470 :
 1480 DEF PROCconvert(value,unit)
 1490 IF select=11 THEN PROCcalctemp:END
PROC
 1500 temp=value*factor(unit)
 1510 IF unit<=no_imps THEN PROCi_to_m E
LSE PROCm_to_i
 1520 ENDPROC
 1530 :
 1540 DEF PROCi_to_m
 1550 FOR i%=1 TO no_imps
 1560  value(i%,select)=temp/factor(i%)
 1570 NEXT
 1580 value(base_m,select)=value(base_i,
select)*convert
 1590 temp=value(base_m,select)/factor(b
ase_m)
 1600 FOR i%=no_imps+1 TO no_imps+no_met
ric
 1610  value(i%,select)=temp/factor(i%)
 1620 NEXT
 1630 ENDPROC
 1640 :
 1650 DEF PROCm_to_i
 1660 FOR i%=no_imps+1 TO no_imps+no_met
ric
 1670  value(i%,select)=temp/factor(i%)
 1680 NEXT
 1690 value(base_i,select)=value(base_m,
select)/convert
 1700 temp=value(base_i,select)/factor(b
ase_i)
 1710 FOR i%=1 TO no_imps
 1720  value(i%,select)=temp/factor(i%)
 1730 NEXT
 1740 ENDPROC
 1750 :
 1760 DEF PROCsetup
 1770 s%=select
 1780 IF s%=1 RESTORE 1990
 1790 IF s%=2 RESTORE 2040
 1800 IF s%=3 RESTORE 2090
 1810 IF s%=4 RESTORE 2140
 1820 IF s%=5 RESTORE 2190
 1830 IF s%=6 RESTORE 2240
 1840 IF s%=7 RESTORE 2290
 1850 IF s%=8 RESTORE 2340
 1860 IF s%=9 RESTORE 2390
 1870 IF s%=10 RESTORE 2440
 1880 IF s%=11 RESTORE 2490
 1890 IF s%=12 RESTORE 2530
 1900 READ no_imps,no_metric,base_i,base
_m,convert
 1910 FOR i%=1 TO no_imps+no_metric
 1920  READ factor(i%)
 1930 NEXT
 1940 FOR i%=0 TO no_imps+no_metric
 1950  READ units$(i%)
 1960 NEXT
 1970 ENDPROC
 1980 :
 1990 DATA 8,5,2,10,25.4
 2000 DATA 0.001,1,12,36,63360,72,72960,
72913.24
 2010 DATA 0.001,1,10,1E3,1E6
 2020 DATA "Length","milli-inch ('thou')
","inch","foot","yard","mile","fathom","
UK nautical mile","Int. nautical mile","
micrometre (micron)","millimetre","centi
metre","metre","kilometre"
 2030 :
 2040 DATA 5,5,1,6,645.160
 2050 DATA 1,144,1296,4.0144896E9,627264
0
 2060 DATA 1,100,1E6,1E10,1E12
 2070 DATA "Area","square inch","square
foot","square yard","square mile","acre"
,"square mm","square cm","square metre",
"hectare","square Km"
 2080 :
 2090 DATA 7,5,1,8,16.387064
 2100 DATA 1,1728,46656,1.73386993,34.67
73986,277.41919,231.00696
 2110 DATA 1,1E3,1E6,1,1E3
 2120 DATA "Volume","cubic inch","cubic
foot","cubic yard","UK fluid ounce","UK
pint","UK gallon","US gallon","cubic cen
timetre","cubic decimetre","cubic metre"
,"millilitre","litre"
 2130 :
 2140 DATA 7,5,3,10,28.3495231
 2150 DATA 2.28571429E-3,1.097143,1,16,1
792,35840,32000
 2160 DATA 0.001,0.2,1,1E3,1E6
 2170 DATA "Weight (Mass)","grain","(oun
ce troy)","ounce Avoir.","pound","hundre
dweight","UK ton","short (US) ton","mill
igram","carat","gram","kilogram","metric
 tonne"
 2180 :
 2190 DATA 4,3,1,5,27.6799
 2200 DATA 1, 5.787037E-4,0.048011012,3.
60478181E-3
 2210 DATA 1,1E-3,1
 2220 DATA "Density","lb/inch^3","lb/foo
t^3","UK ton/yard^3","lb/ UK gal.","gram
/cm.^3","Kg/metre^3","Kg/ litre"
 2230 :
 2240 DATA 5,8,1,11,0.0689476
 2250 DATA 1,6.9444444E-3,15.55555556,0.
49115415,0.036127291
 2260 DATA 0.9806648,1E-5,1E-2,1E-2,1E-3
,1,1.3332244E-3,1.0132505
 2270 DATA "Pressure","lb /sq.inch","lb
/sq.foot","ton /sq.foot","inch of Hg","i
nch of H2O","kg./sq.cm","newton/sq.met",
"kilonewton/sq.met","kilopascal","millib
ars","bar","mm of Hg","atmosphere"
 2280 :
 2290 DATA 6,3,2,7,1.35582
 2300 DATA 0.031080822,1,778.17114,19799
97.3,2.6552197E6,77817114
 2310 DATA 1,1E3,1E6
 2320 DATA "Energy (work,heat)","foot po
undal","foot pound-force","BTU","horsepo
wer/hour","kilowatt/hour","therm","joule
","kilojoule","megajoule"
 2330 :
 2340 DATA 4,2,2,5,4.44822
 2350 DATA 0.0625,1,.031080972,2240
 2360 DATA 1,1000
 2370 DATA "Force","ounce-force","pound-
force","poundal","UK ton-force","newton"
,"kilonewton"
 2380 :
 2390 DATA 2,2,1,3,745.7
 2400 DATA 1,1.81818183E-3
 2410 DATA 1,1
 2420 DATA "Power","horsepower","ft. pou
nd-force/sec","watts","joules/sec"
 2430 :
 2440 DATA 3,2,1,4,0.3048
 2450 DATA 1,1.46667,1.68888889
 2460 DATA 1,0.277777778
 2470 DATA "Velocity","feet / sec.","mil
es / hour","UK knot","metre / sec.","Km
/ hour"
 2480 :
 2490 DATA 1,2,0,0,0
 2500 DATA 0,0,0
 2510 DATA "Temperature","Fahrenheit","C
elsius","Kelvin"
 2520 :
 2530 DATA 2,2,1,3,10.7639
 2540 DATA 1,1
 2550 DATA 1,1
 2560 DATA "Illuminance","foot candle","
lumen/sq.foot.","lux","lumen/sq.metre"
```

Listing Info11

```
   10 REM     >RMSaveS (Info11)
   20 REM By  DL & DA
   30 REM For 32-bit machines
   40 REM (c) BAU July 1993
   50 :
   60 DIM code 400
   70 sp=13:link=14:pc=15
   80 FOR pass=0 TO 2 STEP 2:P%=code
   90 [OPT pass
  100          STMFD  (sp)!,{r0-r7 ,link}
  110          MOV    R6,R1
  120          LDRB   R0,[R6]
  130          CMP    R0,#32
  140          ADRLT  R0,syntax
  150          BLT    exit_error
  160
  170 .skipword
  180          LDRB   R0,[R6]
  190          CMP    R0,#32
  200          ADDGT  R6,R6,#1
  210          BGT    skipword
  220          MOVLT  R6,R1
  230
  240 .skipspaces
  250          LDRB   R0,[R6]
  260          CMP    R0,#32
  270          ADDEQ  R6,R6,#1
  280          BEQ    skipspaces
  290          MOVLT  R6,R1
  300          MOV    R0,#18
  310          SWI    "XOS_Module"
  320          BVS    exit_error
  330          MOV    R0,#10
  340          MOV    R1,R6
  350          LDR    R2,type
  360          LDR    R5,[R3,#-4]
  370          MOV    R4,R3
  380          ADD    R5,R4,R5
  390          MOV    R3,#0
  400          SWI    "XOS_File"
  410          BVS    exit_error
  420
  430 .exit_save
  440          LDMFD  (sp)!,{r0-r7 ,pc}
  450
  460 .exit_error
  470          STR    R0,[sp]
  480          LDMFD  (sp)!,{r0-r7 ,link}
  490          ORRS   pc,link,#1<<28
  500
  510 .type   EQUD &FFA
  520 .syntax EQUD 220
  530          EQUS "Syntax: *RMSave <mod
ule> [<filename>]"
  540          EQUB 13:EQUB 0
  550 ]NEXT
  560 SYS "OS_File",10,"%.RMSave",&FFC,,
code,P%
```

3D GRAPHICS (page 98)

Listing 3DGraphics1

```
   10 REM     >Bres (3DGraphics1)
   20 REM By  Dave Acton
   30 REM For 32-bit machines
   40 REM (c) BAU July 1993
   50 :
   60 MODE 12
   70 MODE 1
   80 *POINTER 1
   90 MOUSE ON 1
  100 bank%=1
  110 DIM spr% &4000,scale% 16
  120 !spr%=&4000
  130 spr%!4=0
  140 spr%!8=16
  150 spr%!12=16
  160 !scale%=8
  170 scale%!4=8
  180 scale%!8=1
  190 scale%!12=1
  200 REPEAT
  210  WAIT
  220  SYS "OS_Byte",112,bank%
  230  bank%=3-bank%
  240  SYS "OS_Byte",113,bank%
  250  VDU 24,0;0;256;256;
  260  CLG
  270  MOUSE x,y,b
  280  GCOL 3
  290  LINE 0,0,x,y
  300  VDU 26
  310  SYS "OS_SpriteOp",&110,spr%,"bres
",,0,0,256,256
  320  SYS "OS_SpriteOp",&134,spr%,"bres
",300,300,0,scale%,-1
  330  GCOL 1
  340  LINE 300,300,300+8*x,300+8*y
  350 UNTIL FALSE
```

Listing 3DGraphics2

```
   10 REM     >BAU3DSrce (3DGraphics2)
   20 REM By  Dave Acton
   30 REM For 32-bit machines
   40 REM (c) BAU July 1993
   50 :
   60 DIM code% &10000,swi$(64),swi(64),
def(64)
   70 def()=FALSE
   80 max_swi=-1
   90 i%=0
  100 REPEAT
  110  SYS "OS_GBPB",9,"Source",code%,1,
i%,&100,"*" TO ,,,read%,i%
  120  IF read%=1 THEN
  130   j%=code%
  140   WHILE ?j%>=32
  150    j%+=1
  160   ENDWHILE
  170   ?j%=13
  180   f$=FNlc($code%)
  190   IF LEFT$(f$,3)="swi" THEN
  200    swi_no=VAL(MID$(f$,4))
  210    def(swi_no)=TRUE
  220    IF swi_no>max_swi max_swi=swi_n
o
  230    swi$(swi_no)="Source."+f$
  240   ENDIF
  250  ENDIF
  260 UNTIL i%=-1
  270 IF max_swi=-1 ERROR 0,"No source f
iles found!"
  280 swi$(64)="Source.Version"
  290 OVERLAY swi$()
  300 swi_chunk=&CE440
  310 vbit=1<<28
  320 wp=12:sp=13:link=14:pc=15
  330 wk=0
  340 k=FNswi00_vars
  350 FOR pass%=4 TO 6 STEP 2
  360 P%=0
  370 O%=code%
  380 [OPT pass%
  390 .module_base
  400          DCD    0
  410          DCD    init
  420          DCD    final
  430          DCD    service
  440          DCD    title
  450          DCD    help
  460          DCD    0
  470          DCD    swi_chunk
  480          DCD    swi_handler
  490          DCD    swi_table
  500          DCD    0
  510
  520 .init    STMFD  (sp)!,{link }
  530          MOV    r0,#6
  540          MOV    r2,#0
  550          MOV    r3,#wk AND &FF
  560          ORR    r3,r3,#wk AND &FF0
0
  570          SWI    "XOS_Module"
  580          MOVVS  r2,#0
  590          LDMFD  (sp)!,{link }
  600          CMP    r2,#0
  610          ADREQ  r0,cant_init
  620          ORREQS pc,link,#vbit
  630          STR    r2,[wp]
  640          BICS   pc,link,#vbit
  650
  660 .cant_init
  670          DCD    0
  680          EQUS   "BAU3D cannot init
ialise"
  690          DCB    0
  700          ALIGN
  710
  720 .final   STMFD  (sp)!,{link }
  730          MOV    r0,#7
  740          LDR    r2,[wp]
  750          SWI    "XOS_Module"
  760          LDMFD  (sp)!,{pc }
  770
  780 .service
  790          STMFD  (sp)!,{link }
  800          LDMFD  (sp)!,{pc }
  810
  820 .title   EQUS   "BAU3D"
  830          DCB    0
  840          ALIGN
  850
  860 .help    EQUS   "BAU3D"
  870          DCB    9
  880          DCB    9
  890          EQUS   FNversion
  900          DCB    0
  910          ALIGN
  920
  930 .swi_handler
  940          LDR    wp,[wp]
  950          CMP    r11,#max_swi+1
  960          ADDCC  pc,pc,r11,LSL #2
  970          B      unknown_swi
  980 ]
  990 FOR swi=0 TO max_swi
 1000  [OPT pass%
 1010          B      swi(swi)
 1020  ]
 1030 NEXT
 1040 [OPT pass%
 1050 .unknown_swi
 1060          ADR    r0,bad_swi_err
 1070          ORRS   pc,link,#vbit
 1080 .bad_swi_err
 1090          DCD    &1E6
 1100          EQUS   "Unknown BAU3D ope
ration"
 1110          DCB    0
 1120          ALIGN
 1130
 1140 .swi_table
 1150          EQUS    "BAU3D"
 1160          DCB    0
 1170 ]
 1180 FOR swi=0 TO max_swi
 1190  IF def(swi) THEN
 1200   [OPT pass%
 1210          EQUS    EVAL("FNswi"+RIGHT
$("0"+STR$swi,2)+"_name")
 1220          DCB    0
 1230   ]
 1240  ELSE
 1250   [OPT pass%
 1260          EQUS    "Unused"+RIGHT$("0
"+STR$swi,2)
 1270          DCB    0
 1280   ]
 1290  ENDIF
 1300 NEXT
 1310 [OPT pass%
 1320          DCB    0
 1330          ALIGN
 1340
 1350 ]
 1360 FOR swi=0 TO max_swi
 1370  swi(swi)=P%
 1380  IF def(swi) THEN
 1390   k=EVAL("FNswi"+RIGHT$("0"+STR$sw
i,2)+"_code")
 1400  ELSE
 1410   [OPT pass%
 1420          MOV    pc,link
 1430   ]
 1440  ENDIF
 1450 NEXT
 1460 [OPT pass%
 1470 .divide
 1480          STMFD  (sp)!,{r3 ,link}
 1490          EOR    r3,r0,r1
 1500          CMP    r0,#0
 1510          RSBLT  r0,r0,#0
 1520          CMP    r1,#0
 1530          RSBLT  r1,r1,#0
 1540          MOV    r14,r1
 1550          CMP    r14,r0,LSR #1
 1560 .div1    MOVLS  r14,r14,LSL #1
 1570          CMPLS  r14,r0,LSR #1
 1580          BLS    div1
 1590          MOV    r2,#0
 1600 .div2    CMP    r0,r14
 1610          SUBCS  r0,r0,r14
 1620          ADC    r2,r2,r2
 1630          MOV    r14,r14,LSR #1
```

```
1640         CMP    r14,r1
1650         BCS    div2
1660         TST    r3,#1<<31
1670         RSBNE  r2,r2,#0
1680         LDMFD  (sp)!,{r3 ,pc}
1690 ]
1700 NEXT pass%
1710 SYS "OS_File",10,"BAU3D",&FFA,,code%,0%
1720 END
1730 :
1740 DEF FNtable(size%)
1750 P%+=size%
1760 O%+=size%
1770 =0
1780 :
1790 DEF FNswap(a,b)
1800 [OPT pass%
1810         EOR    a,a,b
1820         EOR    b,a,b
1830         EOR    a,a,b
1840 ]
1850 =0
1860 :
1870 DEF FNadrl(reg,off)
1880 [OPT pass%
1890         ADD    reg,wp,#(off AND &FF)
1900         ADD    reg,reg,#(off AND &FF00)
1910 ]
1920 =0
1930 :
1940 DEF FNadreql(reg,off)
1950 [OPT pass%
1960         ADDEQ  reg,wp,#(off AND &FF)
1970         ADDEQ  reg,reg,#(off AND &FF00)
1980 ]
1990 =0
2000 :
2010 DEF FNwk(req)
2020 wk+=req
2030 =wk-req
2040 :
2050 DEF FNlc(a$)
2060 LOCAL b$,i,c
2070 FOR i=1 TO LEN(a$)
2080  c=ASCMID$(a$,i)
2090  IF c>=ASC"A" AND c<=ASC"Z" c+=32
2100  b$+=CHR$c
2110 NEXT
2120 =b$
```

Listing 3DGraphics3

```
   10 REM      >Source.SWI00 (3FGraphics3)
   20 REM      BAU3D_Plot source
   30 REM By  Dave Acton
   40 REM For 32-bit machines
   50 REM (c) BAU July 1993
   60 :
   70 DEF FNswi00_name
   80 ="Plot"
   90 :
  100 DEF FNswi00_vars
  110 vdu_out=FNwk(0)
  120 ScreenStart=FNwk(4)
  130 XEigFactor=FNwk(4)
  140 YEigFactor=FNwk(4)
  150 LineLength=FNwk(4)
  160 GWLCol=FNwk(4)
  170 GWBRow=FNwk(4)
  180 GWRCol=FNwk(4)
  190 GWTRow=FNwk(4)
  200 YWindLimit=FNwk(4)
  210 Log2BPP=FNwk(4)
  220 OrgX=FNwk(4)
  230 OrgY=FNwk(4)
  240 max_vert=256
  250 vertices=FNwk(8*max_vert)
  260 max_y=1024
  270 ytab=FNwk(8*max_y)
  280 =0
  290 :
  300 DEF FNswi00_code
  310 [OPT pass%
  320         STMFD  (sp)!,{r0-r12 ,link}
  330         MOV    r6,r0
  340         MOV    r5,r1
  350         ADR    r0,vdu_in
  360         ADD    r1,wp,#vdu_out
  370         SWI    "XOS_ReadVduVariables"
  380         TST    r3,#%100
  390         BNE    os_plot
  400         MOV    r1,#0
  410         MVN    r3,#0
  420         MOV    r2,#&1000000
  430         MOV    r0,r5
  440         ADD    r14,wp,#XEigFactor
  450         LDMIA  r14,{r10 ,r11}
  460         ADD    r7,wp,#vertices
  470 .findminandmax
  480         LDMIA  r0!,{r8 ,r9}
  490         LDR    r14,[wp,#OrgX]
  500         ADD    r8,r8,r14
  510         LDR    r14,[wp,#OrgY]
  520         ADD    r9,r9,r14
  530         MOV    r8,r8,ASR r10
  540         MOV    r9,r9,ASR r11
  550         STMIA  r7!,{r8 ,r9}
  560         CMP    r9,r2
  570         MOVLT  r2,r9
  580         MOVLT  r4,r1
  590         CMP    r9,r3
  600         MOVGT  r3,r9
  610         ADD    r1,r1,#1
  620         CMP    r1,r6
  630         BNE    findminandmax
  640         LDR    r14,[wp,#GWBRow]
  650         CMP    r3,r14
  660         LDMLTFD (sp)!,{r0-r12 ,pc}
  670         LDR    r14,[wp,#GWTRow]
  680         CMP    r2,r14
  690         LDMGEFD (sp)!,{r0-r12 ,pc}
  700         MOV    r1,r6
  710         ADD    r5,wp,#vertices
  720         FNadrl(11,ytab)
  730 .faceloop
  740         ADD    r0,r5,r4,ASL #3
  750         LDMIA  r0,{r7 ,r8}
  760         CMP    r8,r3
  770         FNadreql(11,ytab+4)
  780         ADD    r0,r4,#1
  790         CMP    r0,r6
  800         MOVEQ  r0,#0
  810         ADD    r0,r5,r0,ASL #3
  820         LDMIA  r0,{r9 ,r10}
  830         BL     line
  840         ADD    r4,r4,#1
  850         CMP    r4,r6
  860         MOVEQ  r4,#0
  870         SUBS   r1,r1,#1
  880         BNE    faceloop
  890         LDR    r14,[wp,#GWBRow]
  900         CMP    r2,r14
  910         MOVLT  r2,r14
  920         LDR    r14,[wp,#GWTRow]
  930         CMP    r3,r14
  940         MOVGT  r3,r14
  950         LDR    r0,[sp,#2*4]
  960         LDR    r1,[sp,#3*4]
  970         AND    r1,r1,#%11
  980         ADD    pc,pc,r1,LSL #3
  990         DCD    0
 1000         B      got_colour
 1010         DCD    0
 1020         SWI    "XColourTrans_GCOLToColourNumber"
 1030         B      got_colour
 1040         SWI    "XColourTrans_ReturnColourNumber"
 1050         B      got_colour
 1060         MOV    r0,#255
 1070 .got_colour
 1080         MOV    r7,r0
 1090         LDR    r0,[wp,#Log2BPP]
 1100         MOV    r1,#1
 1110         MOV    r0,r1,LSL r0
 1120         MOV    r1,r1,ASL r0
 1130         SUB    r1,r1,#1
 1140         AND    r7,r7,r1
 1150 .make_into_word
 1160         ORR    r7,r7,r7,LSL r0
 1170         MOV    r0,r0,LSL #1
 1180         CMP    r0,#32
 1190         BLT    make_into_word
 1200         MOV    r4,r7
 1210         MOV    r5,r7
 1220         MOV    r6,r7
 1230 .fill_loop
 1240         FNadrl(14,ytab)
 1250         ADD    r14,r14,r2,ASL #3
 1260         LDMIA  r14,{r8 ,r10}
 1270         CMP    r8,r10
 1280         EORGT  r8,r8,r10
 1290         EORGT  r10,r8,r10
 1300         EORGT  r8,r8,r10
 1310         LDR    r14,[wp,#GWLCol]
 1320         CMP    r10,r14
 1330         BLT    filled
 1340         CMP    r8,r14
 1350         MOVLT  r8,r14
 1360         LDR    r14,[wp,#GWRCol]
 1370         CMP    r8,r14
 1380         BGE    filled
 1390         CMP    r10,r14
 1400         MOVGT  r10,r14
 1410         ADD    r10,r10,#1
 1420         LDR    r14,[wp,#Log2BPP]
 1430         MOV    r10,r10,LSL r14
 1440         MOV    r8,r8,LSL r14
 1450         AND    r1,r8,#31
 1460         MVN    r0,#0
 1470         MOV    r0,r0,LSR r1
 1480         MOV    r1,r0,LSL r1
 1490         BIC    r8,r8,#31
 1500         SUBS   r10,r10,r8
 1510         BLE    filled
 1520         MOV    r8,r8,LSR #3
 1530         LDR    r9,[wp,#ScreenStart]
 1540         LDR    r14,[wp,#YWindLimit]
 1550         RSB    r0,r2,r14
 1560         LDR    r14,[wp,#LineLength]
 1570         MLA    r9,r0,r14,r9
 1580         ADD    r9,r9,r8
 1590         CMP    r10,#32
 1600         RSBLE  r14,r10,#32
 1610         MOVLE  r1,r1,LSL r14
 1620         MOVLE  r1,r1,LSR r14
 1630         LDR    r14,[r9]
 1640         BIC    r14,r14,r1
 1650         AND    r1,r4,r1
 1660         ORR    r14,r14,r1
 1670         STR    r14,[r9],#4
 1680         SUBS   r10,r10,#32
 1690         BLE    filled
 1700 .fill_loop2
 1710         CMP    r10,#128
 1720         STMGEIA r9!,{r4-r7 }
 1730         SUBGE  r10,r10,#128
 1740         BGE    fill_loop2
 1750         CMP    r10,#64
 1760         STMGEIA r9!,{r4-r5 }
 1770         SUBGE  r10,r10,#64
 1780         CMP    r10,#32
 1790         STRGE  r4,[r9],#4
 1800         SUBGE  r10,r10,#32
 1810 .finish_fill
 1820         CMP    r10,#0
 1830         BLE    filled
 1840         MVN    r0,#0
 1850         LDR    r14,[r9]
 1860         AND    r14,r14,r0,LSL r10
 1870         RSB    r10,r10,#32
 1880         ORR    r14,r14,r4,LSR r10
 1890         STR    r14,[r9]
 1900 .filled
 1910         ADD    r2,r2,#1
 1920         CMP    r2,r3
 1930         BLE    fill_loop
 1940         LDMFD  (sp)!,{r0-r12 ,pc}
 1950
 1960 .os_plot
 1970         MOV    r0,r2
 1980         AND    r14,r3,#%11
 1990         CMP    r14,#3
 2000         ADDLT  pc,pc,r14,LSL #3
 2010         B      dont_set_colour
 2020         SWI    "XColourTrans_ColourNumberToGCOL"
 2030         B      set_colour
 2040         B      set_colour
 2050         DCD    0
 2060         SWI    "XColourTrans_ReturnGCOL"
 2070         B      set_colour
 2080 .set_colour
 2090         MOV    r7,r0
 2100         LDR    r8,[wp,#Log2BPP]
 2110         CMP    r8,#3
 2120         MOVEQ  r0,r0,LSR #2
 2130         SWI    &100+18
 2140         SWI    &100+0
 2150         SWI    "XOS_WriteC"
 2160         CMP    r8,#3
 2170         BNE    dont_set_colour
 2180         SUB    sp,sp,#12
 2190         ADR    r14,tint_vdu
 2200         LDMIA  r14,{r9-r11 }
 2210         AND    r0,r7,#3
 2220         ORR    r9,r9,r0,LSL #30
 2230         STMIA  sp,{r9-r11 }
 2240         MOV    r0,sp
 2250         MOV    r1,#10
 2260         SWI    "XOS_WriteN"
 2270         ADD    sp,sp,#12
 2280 .dont_set_colour
 2290         MOV    r4,#1
 2300         SUB    r6,r6,#2
 2310 .os_plot_loop
 2320         MOV    r0,#4
 2330         LDMIA  r5,{r1 ,r2}
 2340         SWI    "XOS_Plot"
 2350         ADD    r10,r5,r4,LSL #3
 2360         LDMIA  r10!,{r1 ,r2}
 2370         SWI    "XOS_Plot"
 2380         MOV    r0,#85
 2390         LDMIA  r10,{r1 ,r2}
 2400         SWI    "XOS_Plot"
 2410         ADD    r4,r4,#1
 2420         SUBS   r6,r6,#1
 2430         BGT    os_plot_loop
 2440         LDMFD  (sp)!,{r0-r12 ,pc}
 2450
 2460 .tint_vdu
 2470         DCB    23
 2480         DCB    17
 2490         DCB    2
 2500         DCB    0
 2510         DCD    0
 2520         DCD    0
 2530
 2540 .line   STMFD  (sp)!,{r1-r6 ,link}
 2550         CMP    r8,r10
 2560         STMGEFD (sp)!,{r7-r10 }
 2570         LDMGEFD (sp)!,{r9-r10 }
 2580         LDMGEFD (sp)!,{r7-r8 }
 2590         SUBS   r5,r9,r7
 2600         RSBMI  r5,r5,#0
 2610         SUBS   r6,r10,r8
 2620         CMP    r6,r5
 2630         BGT    line2
 2640
 2650         RSB    r2,r5,r6,ASL #1
 2660         SUB    r4,r6,r5
 2670         CMP    r8,r10
 2680         MOVGE  r5,#1
 2690         MVNLT  r5,#0
 2700         CMP    r7,r9
 2710         MOVGT  r3,r7
 2720         MOVGT  r7,r9
 2730         MOVGT  r8,r10
 2740         RSBLE  r5,r5,#0
 2750         MOVLE  r3,r9
 2760 .line_loop
 2770         CMP    r8,#max_y
 2780         STRLO  r7,[r11,r8,ASL #3]
 2790         CMP    r7,r3
 2800         LDMGEFD (sp)!,{r1-r6 ,pc}
 2810         ADD    r7,r7,#1
 2820         CMP    r2,#0
 2830         ADDLT  r2,r2,r6,ASL #1
 2840         ADDGE  r8,r8,r5
 2850         ADDGE  r2,r2,r4,ASL #1
 2860         B      line_loop
 2870
 2880 .line2
 2890         RSB    r2,r6,r5,ASL #1
 2900         SUB    r4,r5,r6
 2910         CMP    r7,r9
 2920         MOVGE  r6,#1
 2930         MVNLT  r6,#0
 2940         CMP    r8,r10
 2950         MOVGT  r3,r8
 2960         MOVGT  r8,r10
 2970         MOVGT  r7,r9
 2980         RSBLE  r6,r6,#0
 2990         MOVLE  r3,r10
 3000 .line_loop2
 3010         CMP    r8,#max_y
 3020         STRLO  r7,[r11,r8,ASL #3]
 3030         CMP    r8,r3
 3040         LDMGEFD (sp)!,{r1-r6 ,pc}
 3050         ADD    r8,r8,#1
 3060         CMP    r2,#0
 3070         ADDLT  r2,r2,r5,ASL #1
 3080         ADDGE  r7,r7,r6
 3090         ADDGE  r2,r2,r4,ASL #1
 3100         B      line_loop2
 3110
 3120 .vdu_in DCD    148
 3130         DCD    4
 3140         DCD    5
 3150         DCD    6
 3160         DCD    128
 3170         DCD    129
 3180         DCD    130
 3190         DCD    131
 3200         DCD    12
 3210         DCD    9
 3220         DCD    136
 3230         DCD    137
 3240         DCD    -1
 3250 ]
 3260 =0
```

Listing 3DGraphics4

```
   10 REM      >Source.Version (3DGraphics4)
   20 REM      BAU3D module version
   30 REM By  Dave Acton
   40 REM For 32-bit machines
   50 REM (c) BAU July 1993
   60 :
   70 DEF FNversion="0.10 (09 May 1993)"
```

Listing 3DGraphics5

```
   10 REM      >PolyDemo (3DGraphics5)
   20 REM By  Dave Acton
   30 REM For 32-bit machines
   40 REM (c) BAU July 1993
   50 :
   60 DIM w% &100,mode%(8)
   70 mode%()=0,8,12,13,15,20,21,24
   80 FOR m%=0 TO 7
   90  MODE mode%(m%)
  100  OFF
  110  PRINT"Mode ";mode%(m%)
  120  FOR try%=0 TO 1
  130   IF try%=0 bits%=%100 ELSE bits%=0
  140   GCOL 0 TINT 0
  150   RECTANGLE FILL 0,0,1279,1023-32
  160   SYS "OS_ReadModeVariable",mode%(m%),9 TO ,,log2bpp
  170   TIME=0
  180   was%=-1
  190   FOR poly%=0 TO 7
  200    sides%=poly%+3
  210    REPEAT
  220     CASE log2bpp OF
  230      WHEN 0:c%=1
  240      WHEN 1:c%=RND(3)
  250      WHEN 2:c%=RND(7)
  260      WHEN 3:c%=RND(255)
  270     ENDCASE
  280    UNTIL c%<>was%
  290    IF log2bpp>0 was%=c%
  300    PROCpoly_test(sides%,256+256*(poly% MOD 4),256+512*(poly% DIV 4),200,c%,bits%)
  310   NEXT
  320   IF try%=0 PRINTTAB(12,0);"OS: "; ELSE PRINTTAB(24,0);"Fast: ";
  330    PRINT;TIME/100
  340  NEXT
  350  PRINT"Press a key..."
  360  key=GET
  370 NEXT
  380 END
  390 :
  400 DEF PROCpoly_test(sides%,cx%,cy%,r%,colour%,bits%)
  410 LOCAL i%
  420 FOR i%=0 TO sides%-1
  430  !(w%+8*i%)=cx%+r%*SINRAD(i%*360/sides%)
  440  !(w%+8*i%+4)=cy%+r%*COSRAD(i%*360/sides%)
  450 NEXT
  460 FOR i%=1 TO 50
  470  SYS "BAU3D_Plot",sides%,w%,colour%,bits%
  480 NEXT
  490 ENDPROC
```

Listing 3DGraphics6

```
   10 REM      >PlayBack (3DGraphics6)
   20 REM      New playback procedure for 3DProcs
   30 REM By  Dave Acton
   40 REM For 32-bit machines
   50 REM (c) BAU July 1993
   60 :
   70 DEF PROCplay_back
   80 bank=1
   90 bits=%01
  100 FOR frame=0 TO frames-1
  110  WAIT
  120  SYS 6,112,bank
  130  bank=3-bank
  140  SYS 6,113,bank
  150  SYS "ColourTrans_SetGCOL",&1FB34700
  160  RECTANGLE FILL -640,-512,1280,512
  170  SYS "ColourTrans_SetGCOL",&FFFFCA00
```

```
 180  RECTANGLE FILL -640,0,1280,512
 190  IF bits=%01 PRINTTAB(0,0)"Fast" E
LSE PRINTTAB(0,0)"OS  "
 200  a=frame_ptr(frame)
 210  WHILE !a<>-1
 220   SYS "BAU3D_Plot",3,a+4,!a,bits
 230   a+=28
 240  ENDWHILE
 250  IF INKEY(0)=13 bits=bits EOR %100
 260 NEXT
 270 ENDPROC
```

Listing 3DGraphics7

```
  10 REM     >Gouraud (3DGraphics7)
  20 REM By  Dave Acton
  30 REM For 32-bit machines
  40 REM (c) BAU July 1993
  50 :
  60 MODE 13
  70 OFF
  80 PROCinit
  90 CLS
 100 PROCrgb_tri
 110 i=GET
 120 CLS
 130 REPEAT
 140  PROCrand_tri
 150 UNTIL FALSE
 160 END
 170 :
 180 DEF PROCrgb_tri
 190 LOCAL v%()
 200 DIM v%(2,4)
 210 v%()=10,10,255,0,0,200,50,0,255,0,
100,200,0,0,255
 220 PROCgouraud(v%())
 230 ENDPROC
 240 :
 250 DEF PROCrand_tri
 260 LOCAL v%()
 270 DIM v%(2,4)
 280 cx%=RND(240)+30
 290 cy%=RND(200)+28
 300 a%=RND(360)
 310 FOR i%=0 TO 2
 320  FOR j%=2 TO 4
 330   v%(i%,j%)=RND(256)-1
 340  NEXT
 350  REPEAT
 360   rad%=20+RND(150)
 370   v%(i%,0)=cx%+rad%*COSRAD(a%+120*
i%)
 380   v%(i%,1)=cy%-rad%*SINRAD(a%+120*
i%)
 390  UNTIL v%(i%,0)>0 AND v%(i%,0)<320
 AND v%(i%,1)>0 AND v%(i%,1)<256
 400 NEXT
 410 PROCgouraud(v%())
 420 ENDPROC
 430 :
 440 DEF PROCgouraud(v%())
 450 miny%=&10000
 460 maxy%=-1
 470 ytab%()=-1
 480 FOR i%=0 TO 2
 490  IF v%(i%,1)<miny% THEN
 500   miny%=v%(i%,1)
 510   curface%=i%
 520  ENDIF
 530  IF v%(i%,1)>maxy% THEN maxy%=v%(i
%,1)
 540 NEXT
 550 side%=0
 560 FOR i%=0 TO 2
 570  IF v%(curface%,1)=maxy% THEN side
%=1
 580  next%=(curface%+1) MOD 3
 590  PROCbres(curface%,next%)
 600  curface%=(curface%+1) MOD 3
 610 NEXT
 620 err1%()=0
 630 err2%()=0
 640 FOR y%=miny% TO maxy%
 650  IF ytab%(y%,0)>0 AND ytab%(y%,1)>
0 THEN
 660   IF ytab%(y%,0)>ytab%(y%,1) SWAP
ytab%(y%,0),ytab%(y%,1):SWAP rgb%(y%,0),
rgb%(y%,1)
 670   r1%=rgb%(y%,0) AND &FF
 680   g1%=(rgb%(y%,0)>>8) AND &FF
 690   b1%=(rgb%(y%,0)>>16) AND &FF
 700   r2%=rgb%(y%,1) AND &FF
 710   g2%=(rgb%(y%,1)>>8) AND &FF
 720   b2%=(rgb%(y%,1)>>16) AND &FF
 730   len%=ytab%(y%,1)-ytab%(y%,0)
 740   r_err%=0
 750   g_err%=0
 760   b_err%=0
 770   FOR x%=0 TO len%
 780    IF len%>0 THEN
 790     r%=r1%+(r2%-r1%)*(x%/len%)
 800     g%=g1%+(g2%-g1%)*(x%/len%)
 810     b%=b1%+(b2%-b1%)*(x%/len%)
 820    ELSE
 830     r%=r1%
 840     g%=g1%
 850     b%=b1%
 860    ENDIF
 870    IF error%=os% THEN
 880     SYS "ColourTrans_SetGCOL",(r%<
<8)+(g%<<16)+(b%<<24),,,&100
 890    ELSE
 900     r%+=err1%(x%,0)
 910     g%+=err1%(x%,1)
 920     b%+=err1%(x%,2)
 930     IF r%<0 r%=0 ELSE IF r%>255 r%
=255
 940     IF g%<0 g%=0 ELSE IF g%>255 g%
=255
 950     IF b%<0 b%=0 ELSE IF b%>255 b%
=255
 960     best%=closest%(r%/16,g%/16,b%/
16)
 970     r_err%=(r%-col%(best%,0))
 980     g_err%=(g%-col%(best%,1))
 990     b_err%=(b%-col%(best%,2))
1000     CASE error% OF
1010      WHEN simple%:
1020       err1%(x%+1,0)+=r_err%:err1%(
x%+1,1)+=g_err%:err1%(x%+1,2)+=b_err%
1030      WHEN fsi%:
1040       err1%(x%+1,0)+=r_err%*7/16:e
rr1%(x%+1,1)+=g_err%*7/16:err1%(x%+1,2)+
=b_err%*7/16
1050       IF x%>0 THEN err2%(x%-1,0)+=
r_err%*3/16:err2%(x%-1,1)+=g_err%*3/16:e
rr2%(x%-1,2)+=b_err%*3/16
1060       err2%(x%,0)+=r_err%*5/16:err
2%(x%,1)+=g_err%*5/16:err2%(x%,2)+=b_err
%*5/16
1070       err2%(x%+1,0)+=r_err%*1/16:e
rr2%(x%+1,1)+=g_err%*1/16:err2%(x%+1,2)+
=b_err%*1/16
1080     ENDCASE
1090     GCOL gcol%(best%) TINT tint%(b
est%)
1100    ENDIF
1110    POINT 4*(x%+ytab%(y%,0)),4*y%
1120   NEXT
1130   err1%()=err2%()
1140   err2%()=0
1150  ENDIF
1160 NEXT
1170 ENDPROC
1180 :
1190 DEF PROCbres(p1%,p2%)
1200 x1%=v%(p1%,0)
1210 y1%=v%(p1%,1)
1220 r1%=v%(p1%,2)
1230 g1%=v%(p1%,3)
1240 b1%=v%(p1%,4)
1250 x2%=v%(p2%,0)
1260 y2%=v%(p2%,1)
1270 r2%=v%(p2%,2)
1280 g2%=v%(p2%,3)
1290 b2%=v%(p2%,4)
1300 dx%=ABS(x2%-x1%)
1310 dy%=ABS(y2%-y1%)
1320 IF dx%>dy% THEN
1330  d%=2*dy%-dx%
1340  incr1%=dy%*2
1350  incr2%=2*(dy%-dx%)
1360  IF y1%>=y2% inc%=1 ELSE inc%=-1
1370  IF x1%>x2% end%=x1%:x1%=x2%:y1%=y
2%:SWAP r1%,r2%:SWAP g1%,g2%:SWAP b1%,b2
% ELSE inc%=-inc%:end%=x2%
1380  len%=end%-x1%
1390  FOR j%=0 TO len%
1400   ytab%(y1%,side%)=x1%+j%
1410   r%=r1%+(r2%-r1%)*(j%/len%)
1420   g%=g1%+(g2%-g1%)*(j%/len%)
1430   b%=b1%+(b2%-b1%)*(j%/len%)
1440   rgb%(y1%,side%)=r%+(g%<<8)+(b%<<
16)
1450   IF d%<0 d%=d%+incr1% ELSE y1%+=i
nc%:d%+=incr2%
1460  NEXT
1470 ELSE
1480  d%=2*dx%-dy%
1490  incr1%=dx%*2
1500  incr2%=2*(dx%-dy%)
1510  IF x1%>=x2% THEN inc%=1 ELSE inc%
=-1
1520  IF y1%>y2% THEN end%=y1%:y1%=y2%:
x1%=x2%:SWAP r1%,r2%:SWAP g1%,g2%:SWAP b
1%,b2% ELSE inc%=-inc%:end%=y2%
1530  len%=end%-y1%
1540  FOR j%=0 TO len%
1550   ytab%(y1%+j%,side%)=x1%
1560   r%=r1%+(r2%-r1%)*(j%/len%)
1570   g%=g1%+(g2%-g1%)*(j%/len%)
1580   b%=b1%+(b2%-b1%)*(j%/len%)
1590   rgb%(y1%+j%,side%)=r%+(g%<<8)+(b
%<<16)
1600   IF d%<0 d%+=incr1% ELSE x1%+=inc
%:d%+=incr2%
1610  NEXT
1620 ENDIF
1630 ENDPROC
1640 :
1650 DEF PROCinit
1660 PRINT"Please wait..."
1670 SYS "OS_SWINumberFromString",,"Col
ourTrans_ReturnColourNumber" TO sys_ret%
1680 SYS "OS_SWINumberFromString",,"Col
ourTrans_ColourNumberToGCOL" TO sys_togc
ol%
1690 DIM ytab%(256,1),rgb%(256,1),col%(
255,2)
1700 DIM err1%(640,2),err2%(640,2),clos
est%(15,15,15)
1710 DIM gcol%(255),tint%(255)
1720 FOR i%=0 TO 255
1730  SYS "OS_ReadPalette",i%,16 TO ,,r
gb
1740  col%(i%,0)=(rgb>>8) AND &FF
1750  col%(i%,1)=(rgb>>16) AND &FF
1760  col%(i%,2)=(rgb>>24) AND &FF
1770 NEXT
1780 FOR r%=0 TO 15
1790  FOR g%=0 TO 15
1800   FOR b%=0 TO 15
1810    SYS sys_ret%,(r%<<12)+(g%<<20)+
(b%<<28) TO closest%(r%,g%,b%)
1820   NEXT
1830  NEXT
1840 NEXT
1850 FOR i%=0 TO 255
1860  SYS sys_togcol%,i% TO j%
1870  gcol%(i%)=j% DIV 4
1880  tint%(i%)=(j% AND 3)<<6
1890 NEXT
1900 none%=0:os%=1:simple%=2:fsi%=3
1910 CLS
1920 REPEAT
1930  PRINT"0 - none"
1940  PRINT"1 - ColourTrans dithering"
1950  PRINT"2 - simple"
1960  PRINT"3 - FS"
1970  INPUT"Error correction (0-3): "er
ror%
1980 UNTIL error%>=0 AND error%<=3
1990 ENDPROC
```

Listing 3DGraphics8

```
  10 REM     >Vase (3DGraphics8)
  20 REM By  Dave Acton
  30 REM For 32-bit machines
  40 REM (c) BAU July 1993
  50 :
  60 MODE 13:OFF:ORIGIN 640,512
  70 y_step=20:y_size=1000/y_step
  80 ang_step=60:ang=360/ang_step
  90 d=800:zoff=1600:DIM r(y_step)
 100 REPEAT
 110  SYS "ColourTrans_SetGCOL",&E0C080
00,,,&80
 120  CLG
 130  r(0)=RND(300)+300:dr=-RND(50)
 140  FOR i=1 TO y_step
 150   r(i)=r(i-1)+dr
 160   IF r(i)<50 r(i)=50:dr=-dr/4 ELSE
 IF r(i)>800 r(i)=800:dr=-dr
 170   dr+=RND(40)-20
 180  NEXT
 190  col=RND(3)*8
 200  FOR b=90 TO 180 STEP ang
 210   FOR s=-1 TO 1 STEP 2
 220    a=b*s
 230    FOR i=1 TO y_step
 240     y=-500+y_size*i
 250     wasy=y-y_size
 260     r=r(i)
 270     wasr=r(i-1)
 280     x0=wasr*SINRAD(a)
 290     y0=wasy
 300     z0=wasr*COSRAD(a)
 310     x1=r*SINRAD(a)
 320     y1=y
 330     z1=r*COSRAD(a)
 340     x2=wasr*SINRAD(a+ang)
 350     y2=wasy
 360     z2=wasr*COSRAD(a+ang)
 370     x3=r*SINRAD(a+ang)
 380     y3=y
 390     z3=r*COSRAD(a+ang)
 400     sh=INT(COSRAD(a+90)*&60+&80)
 410     SYS "ColourTrans_SetGCOL",(sh<
<col),,,&100
 420     PROCplot(4,x0,y0,z0)
 430     PROCplot(4,x1,y1,z1)
 440     PROCplot(85,x2,y2,z2)
 450     PROCplot(85,x3,y3,z3)
 460    NEXT
 470   NEXT
 480  NEXT
 490  k=GET
 500 UNTIL FALSE
 510 END
 520 :
 530 DEF PROCplot(code,x,y,z)
 540 PLOT code,d*x/(zoff+z),d*y/(zoff+z
)
 550 ENDPROC
```

ULTIMODE (page 109)

Listing UltiMode1

```
  10 REM     >UltiMode
  20 REM By  Carl Stockton
  30 REM For 32-bit machines
  40 REM (C) BAU July 1993
  50 :
  60 overflow=&10000000
  70 value=0:flags=1:altdown=1
  80 DIM code% 1024
  90 FOR i%=4 TO 7 STEP 3
 100 P%=0:O%=code%
 110 [OPT i%
 120 .start
 130 EQUD 0:EQUD init:EQUD fin
 140 EQUD 0:EQUD title
 150 EQUD help:EQUD 0
 160
 170 .title
 180 EQUS "UltiMode":EQUB 0
 190
 200 .help
 210 EQUS "UltiMode":EQUB 9
 220 EQUS "1.00 (06 Apr 1993)":EQUB 0
 230 ALIGN
 240
 250 .init
 260 STMFD R13!,{r7-r11 ,R14}
 270 MOV R0,#16:ADR R1,event
 280 MOV R2,R12:SWI "XOS_Claim"
 290 BVS claimerror
 300 MOV R0,#14:MOV R1,#11
 310 SWI "XOS_Byte":BVS eventerror
 320 LDMFD R13!,{r7-r11 ,PC}^
 330
 340 .fin
 350 STMFD R13!,{r7-r11 ,R14}
 360 MOV R0,#13:MOV R1,#11
 370 SWI "XOS_Byte"
 380 MOV R0,#16:ADR R1,event
 390 MOV R2,R12:SWI "XOS_Release"
 400 LDMFD R13!,{r7-r11 ,PC}^
 410
 420 .eventerror
 430 MOV R4,R0:MOV R0,#16
 440 ADR R1,event:MOV R2,R12
 450 SWI "XOS_Release":MOV R0,R4
 460
 470 .claimerror
 480 MOV R1,#1:ADR R2,ultimode
 490 SWI "XWimp_ReportError"
 500 LDMFD R13!,{r7-r11 ,PC}^
 510
 520 .event
 530 TEQ R1,#0:BEQ keyup
 540 TEQ R2,#&37:TEQNE R2,#&38
 550 TEQNE R2,#&39:TEQNE R2,#&48
 560 TEQNE R2,#&49:TEQNE R2,#&4A
 570 TEQNE R2,#&5A:TEQNE R2,#&5B
 580 TEQNE R2,#&5C:TEQNE R2,#&65
 590 MOVNES PC,R14
 600 STMFD R13!,{r0-r9 ,R14}
 610 MOV R9,PC:ORR R8,R9,#3
 620 TEQP R8,#0:MOV R0,R0
 630 STMFD R13!,{r14 }
 640 MOV R7,R2:LDRB R4,[R12,#flags]
 650 TST R4,#altdown:BEQ testforalt
 660 LDRB R0,[R12,#value]
 670 MOV R0,R0,ASL#1
 680 ADD R0,R0,R0,ASL#2
 690
 700 .calc
 710 TEQ R7,#&37:MOVEQ R1,#7
 720 TEQ R7,#&38:MOVEQ R1,#8
 730 TEQ R7,#&39:MOVEQ R1,#9
 740 TEQ R7,#&48:MOVEQ R1,#4
 750 TEQ R7,#&49:MOVEQ R1,#5
 760 TEQ R7,#&4A:MOVEQ R1,#6
 770 TEQ R7,#&5A:MOVEQ R1,#1
 780 TEQ R7,#&5B:MOVEQ R1,#2
 790 TEQ R7,#&5C:MOVEQ R1,#3
 800 TEQ R7,#&65:MOVEQ R1,#0
 810 ADD R0,R0,R1:STRB R0,[R12,#value]
 820 B backtomode
 830
 840 .testforalt
 850 MOV R0,#129:MOV R1,#253
 860 MOV R2,#255:SWI "XOS_Byte"
 870 CMP R1,#255:BNE backtomode
 880 MOV R0,#129:MOV R1,#255
 890 MOV R2,#255:SWI "XOS_Byte"
 900 CMP R1,#255:MOVEQ R0,#0
 910 ORREQ R4,R4,#altdown
 920 STREQB R4,[R12,#flags]:BEQ calc
 930
 940 .backtomode
 950 LDMFD R13!,{r14 }
 960 TEQP R9,#0:MOV R0,R0
 970 LDMFD R13!,{r0-r9 ,PC}^
 980
 990 .keyup
1000 TEQ R2,#&5E:TEQNE R2,#&60
1010 MOVNES PC,R14
1020 STMFD R13!,{r0-r9 ,R14}
1030 LDRB R0,[R12,#flags]
1040 TST R0,#altdown
1050 LDMEQFD R13!,{r0-r9 ,PC}^
1060 BIC R0,R0,#altdown
1070 STRB R0,[R12,#flags]
1080 MOV R9,PC:ORR R8,R9,#3
1090 TEQP R8,#0:MOV R0,R0
1100 STMFD R13!,{r14 }
1110 ADR R0,callback:MOV R1,R12
1120 SWI "XOS_AddCallBack"
1130 B backtomode
1140
1150 .callback
1160 STMFD R13!,{r0-r3 ,R14}
1170 LDRB R0,[R12,#value]
1180 SWI "XWimp_SetMode"
1190 MOV R0,#21:MOV R1,#0
1200 SWI "XOS_Byte"
1210 LDMFD R13!,{r0-r3 ,PC}
1220
1230 .ultimode
1240 EQUS "UltiMode":EQUB 0
1250 ]
1260 NEXT
1270 SYS "OS_File",10,"UltiRM",&FFA,,co
de%,O%
```

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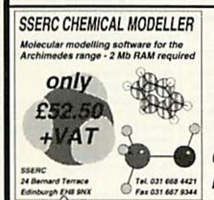
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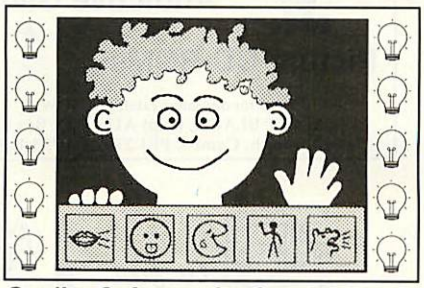
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ACORN USER ADVERTISEMENT PAGES JULY 1993

THE MOXON INTERVIEW

MARTIN COULSON

From designing TV logos to heading the innovative Atomwide, Acorns have been a constant in Martin Coulson's career

There's something about the way the waiter greets Martin Coulson and Mandy House – the team that runs Atomwide – which suggests that, just possibly, they may have been to this restaurant before. Perhaps it's the way the staff are on first-name terms, or the way Martin refers to spaghetti bolognese as 'the old faithful'; whatever it is, the environment is as congenial as they are.

Martin looks totally at ease in a pair of jeans and a white teeshirt, tucking into a bowl of tortellini soup and casually reeling off a life story that has more than a little connection with Acorn computers.

'I first came across an Acorn computer when I was an apprentice with the Ministry of Defence,' he explains, pausing while I try to combine pasta twirling with frantic scribbling. 'It all started when I built an Acorn Atom from a kit while I was studying engineering.'

He then moved on to designing colour-grading systems for video, basing the hardware around the same processor as used in the Beeb: the 6502. As Martin orders another Coke (he's driving) I sense a certain dedication to Acorn computers: he's proud of the fact that he's been able to introduce Acorns to environments which one would not normally connect with Beebs and Arcs.

His next job was as a junior engineer at Air TV. It was at this time that Martin met Alex van Someren (of Aleph One), and they joined forces to sort out a company called Autocue which, not surprisingly, built autocue equipment for television companies. Martin designed a 0.5Mb memory expansion card for the Master Compact which acted as a large Ram disc, and Alex organised the script preparation software. Martin reckons that at that time most



KAREN WILLIAMS

autocue equipment used in television was based on Master Compacts.

'Alex and I got together again to design a subtitling system based round an Archimedes and a Wild Vision Genlock card, and I sold a couple to duplicating houses in West London,' he says, tucking into his spaghetti with a vengeance. 'Meanwhile at Air TV I got involved in setting up transmission systems for MTV Europe. The MTV logo that sits at the top right-hand corner of the screen was actually created in *Paint* on an Archimedes. A 14-line Basic program converted the sprite into a Rom image, which we blew into an Eprom and slotted into the genlock machine. The normal method was to describe the logo on paper and send it off to be coded, but of course, my method was far slicker.'

Not content with that, he used BBCs to produce leader clocks – the counters that appear on the television when they get things wrong and wrote a program – the only time he has ever ventured into mahcine code – to make a Beeb churn out accurate timings.

And there's more. Martin continues: 'When MTV started broadcasting, they had a computer which created the playlists, and a machine which actually played the video. I wrote a program in C to convert the file from the playlist computer so that it was suitable for the video machine, and guess what: that was compiled on an Archimedes.

'My next job was to help set up outside broadcast units during the Gulf War for an early morning news station. We set the system up in the back of a Renault Espace, but for once I wasn't able to get a Master involved in it. Shame.'

Martin and Mandy's house is overrun with seven cats, thousands of chips and circuit boards, and a budgie called Bernard, and there's a office at the bottom of the garden where Martin does all his hardware designing.

Working with Acorns is obviously a life which both Martin and Mandy enjoy immensely, and according to Martin, this is due to a combination of the good nature of the Acorn market – 'people don't stab you in the back in this game' – and the fact that he's his own boss. 'In the world of TV there's always pressure on you from above, but when you're your own boss, you can make your own decisions,' he says. 'If I don't want to get up, I don't have to'

Mark Moxon